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Ninety-first Annual Session

VOLUME 41
NUMBER 5

Atlantic City Oct. 30-Nov. 2

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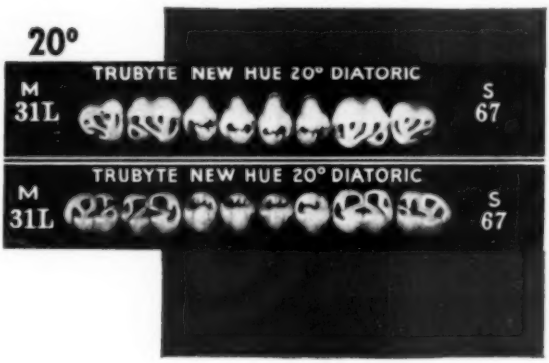

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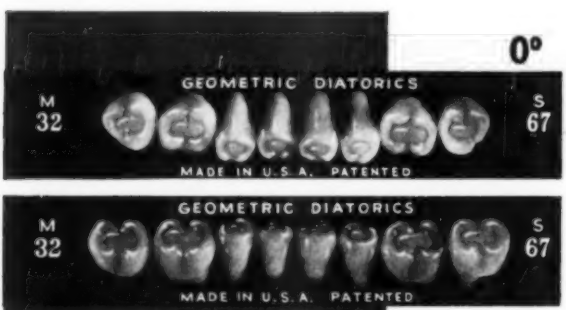

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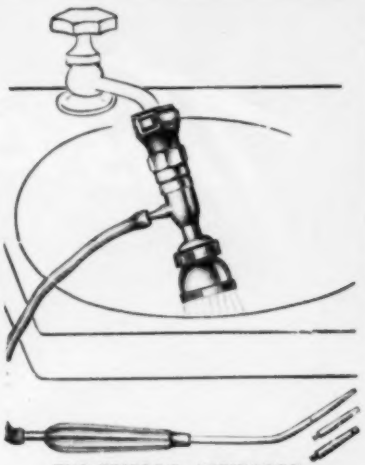

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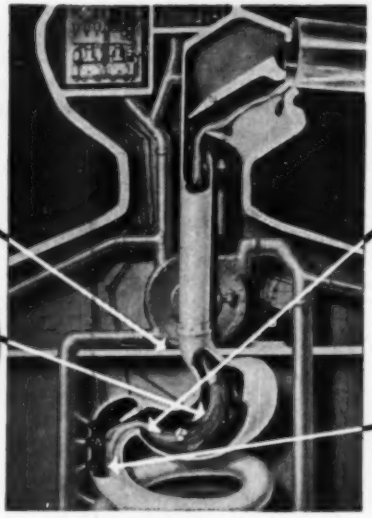

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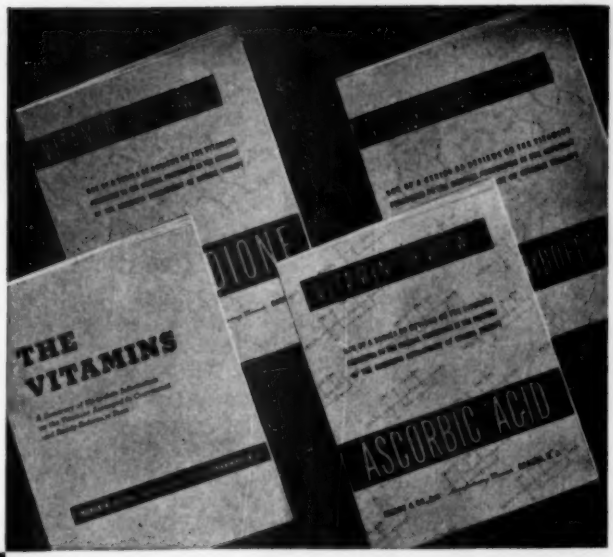

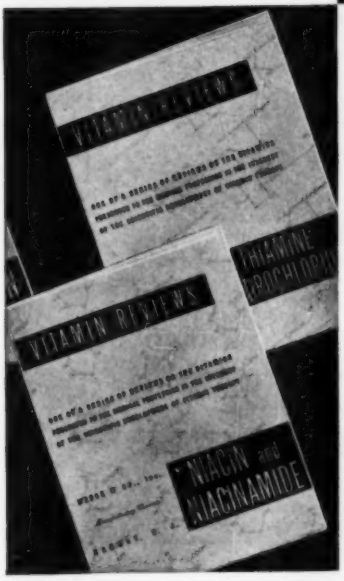

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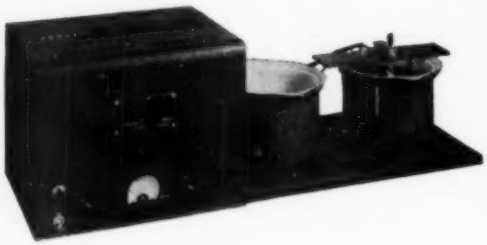

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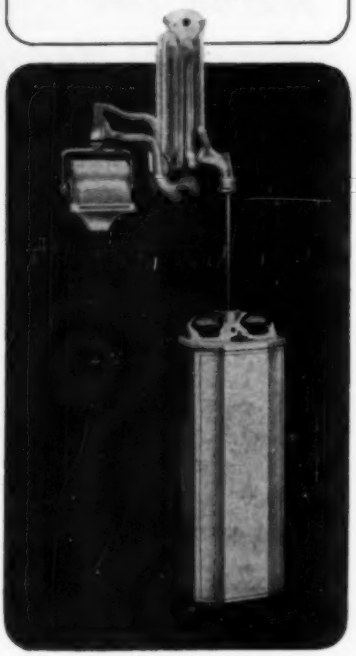

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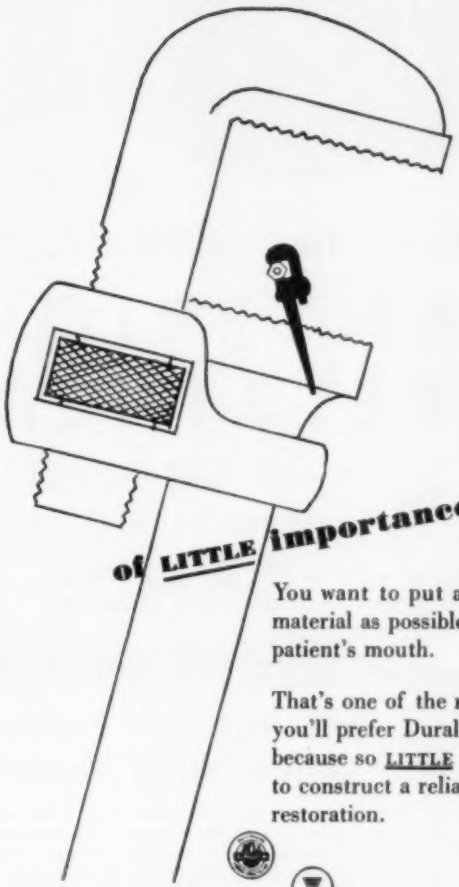

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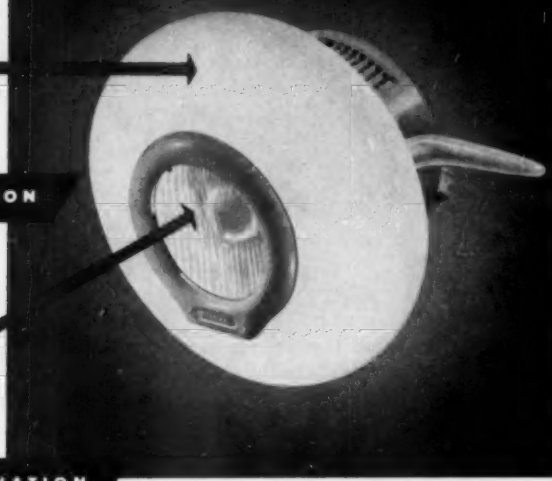

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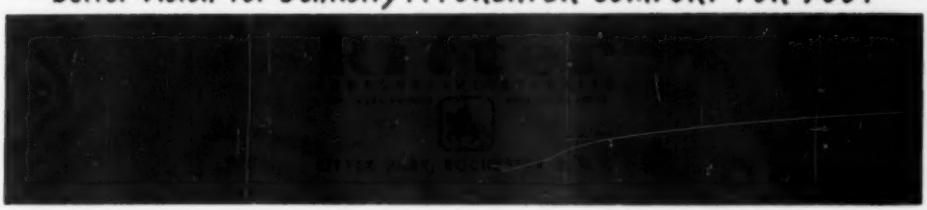

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* Fosdick, L. S., The Reduction of the Incidence of Dental Caries. I. Immediate Tooth Brushing with a Neutral Dentifrice, J.A.D.A. Vol. 40, No. 2, February 1950.

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Biomicroscopic (slit-lamp) evaluation of the normal gingiva of the albino rat

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Biomicroscopy entails the microscopic examination of tissues *in vivo* using a slit-lamp illumination. It has been employed in studies of the lip,[1] nailbed,[2,3] eye,[4,5] tongue[6,7] and gingiva.[7-12] Investigation of the gingiva of humans[7] and experimental animals[12] has given rise to the impression that biomicroscopy might be a useful clinical aid in the diagnosis of gingival disease.

Because of our interest in the suggested availability of an additional clinical aid in the periodontal field, it was felt that further exploration of the usefulness of the biomicroscope was indicated. Animal investigation was selected as the initial approach because it offered the opportunity of substantiating biomicroscopic observations with histologic findings. It was also our opinion that evaluation of the biomicroscope in the field of gingival

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1. Hueter, C., Cheilangoscopy—A new investigative method for physiological and pathological purposes. Centralbe f. d. med. Wissenschaft 13:223, 1879.

2. Lombard, W. P., The blood pressure in the arterioles, capillaries, and small veins of the human skin. Am. J. Physiol. 29:335, 1912.

3. Weiss, E., Mikroscopic observation on capillaries. Wien. Klin. Wchnschr. 33:840 (Sept. 16) 1920.

4. Bedell, A. J., Slitlamp. Am. J. Opthalm. 8:150 (Feb.) 1925.

5. Jackson, E., Biomicroscopy. Am. J. Opthalm. 8:250, 1925.

6. Kruse, H. D., The gingival manifestations of avitaminosis C with especial consideration of the detection of early changes by biomicroscopy. Milbank Mem. Quart. 20:290 (July) 1942.

7. King, J. D., Experimental investigations of paradontal disease: V. Capillary microscopy as a clinical aid to assessment of gingival health and disease. D. Record 67:3 (Jan.) 1947.

8. Citron, J., Investigations of general medical conditions which initiate periodontosis. Med. Klin. 25:1419, 1929.

9. Bock, H. and Redisch, W., The importance of capillariscopy in the clinical management and therapy of alveolo-pyorrhea. Zschr. Stomat. 28:552, 1930.

10. Wikblad, A., Capillary microscopy in the pathology and therapy of marginal paradentitis. Zahnarzth. Rund. 18:792, 1935.

11. Pelzer, R. H., A study of the local oral effect of diet on the periodontal tissues and the gingival capillary structure. J.A.D.A. 27:13 (Jan.) 1940.

12. King, J. D. and Glover, R. E., The relative effects of dietary constituents and other factors upon calculus formation and gingival disease in the ferret. J. Path. and Bact. 57:353 (July) 1945.

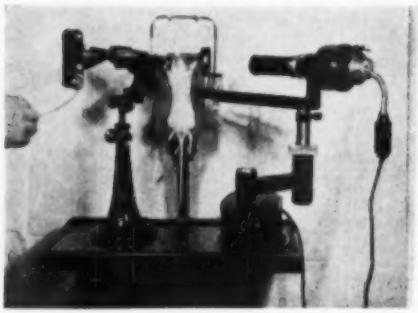

Fig. 1 • Modified Bausch and Lomb Universal Slit Lamp with camera attached to wide field binocular microscope and rat board in position

disease should be preceded by investigation of the biomicroscopic pattern of normal gingiva. A correlated gross, biomicroscopic and histologic investigation of normal gingiva was therefore undertaken in experimental animals in an effort to determine first, whether the biomicroscope revealed gingival features undetectable by simple visual examination, and second, if these features constituted accurate indexes of the underlying histologic structures.

EXPERIMENTAL METHOD

A modified Bausch and Lomb Universal Slit Lamp with wide field binocular microscope was used for biomicroscopic observations. With this instrument it was possible to obtain magnifications of 16 and 31 times. Our modifications of the standard apparatus included the replacement of the chin rest by an animal board, insertion of a green filter over the light source and the adaptation of a photographic attachment on one of the oculars (Fig. 1). Using a Leica standard camera with a 3.5 aperture set at infinity, 3-4 seconds was determined as the optimum exposure using Kodak XX panchromatic film. With the modified apparatus, an albino rat could be placed in a vertical position on the board with the mouth open and the lower lip retracted, so that the gingiva in relation to the lower anterior teeth was accessible for study (Fig. 2). A narrow beam of light was then directed at the gingiva at an angle so that a limited area could be visualized by transillumination.

One hundred and fifty male albino rats, each weighing approximately 300 grams, on a Purina dog chow diet, were used as experimental animals. Under Nembutal anesthesia, each animal was placed in position on the board as indicated in Figure 2. Biomicroscopic observations were made at different times of the day and at periods from 15 to 30 minutes after the animals were removed from the cages where food was available. The time schedule was arranged in this manner in an effort to eliminate the variable effect of mastication and food on the gingiva. Each animal was kept under constant biomicroscopic observation for a 20 minute period, so that capillary changes which might be induced by lip retraction and exposure to air could be observed and properly evaluated. At the end of the observation period, twenty of the animals were sacrificed and the anterior portion of the mandible with the two incisors and the soft tissue was removed and prepared for microscopic study.

Fig. 2 • Animal in position with lip retracted

Fig. 3 • Biomicroscopic view of normal gingiva showing capillary outlines. (X 16)

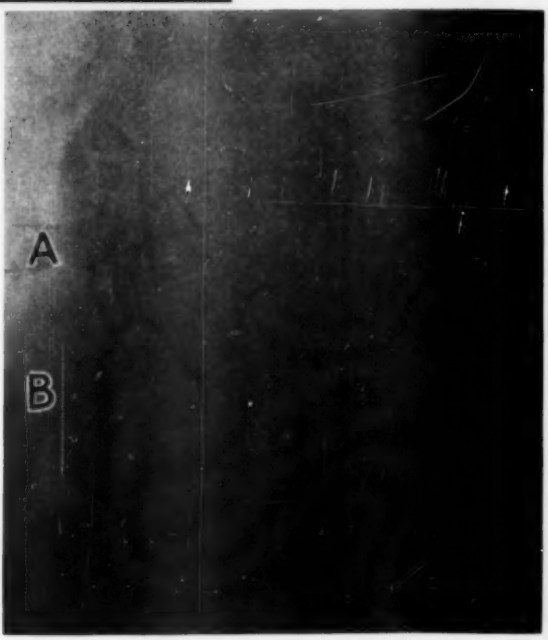

Fig. 4 • High power biomicroscopic view of normal gingiva showing A, marginal and B, submarginal capillaries. (X 31)

With the above procedure, it was possible to correlate the gross, biomicroscopic and histologic appearance of the gingiva. High and low power biomicroscopic views are shown in Figures 3, 4, 5 and 6.

OBSERVATIONS

In general, the gross appearance of the gingiva in the lower anterior region was essentially the same in all of the animals

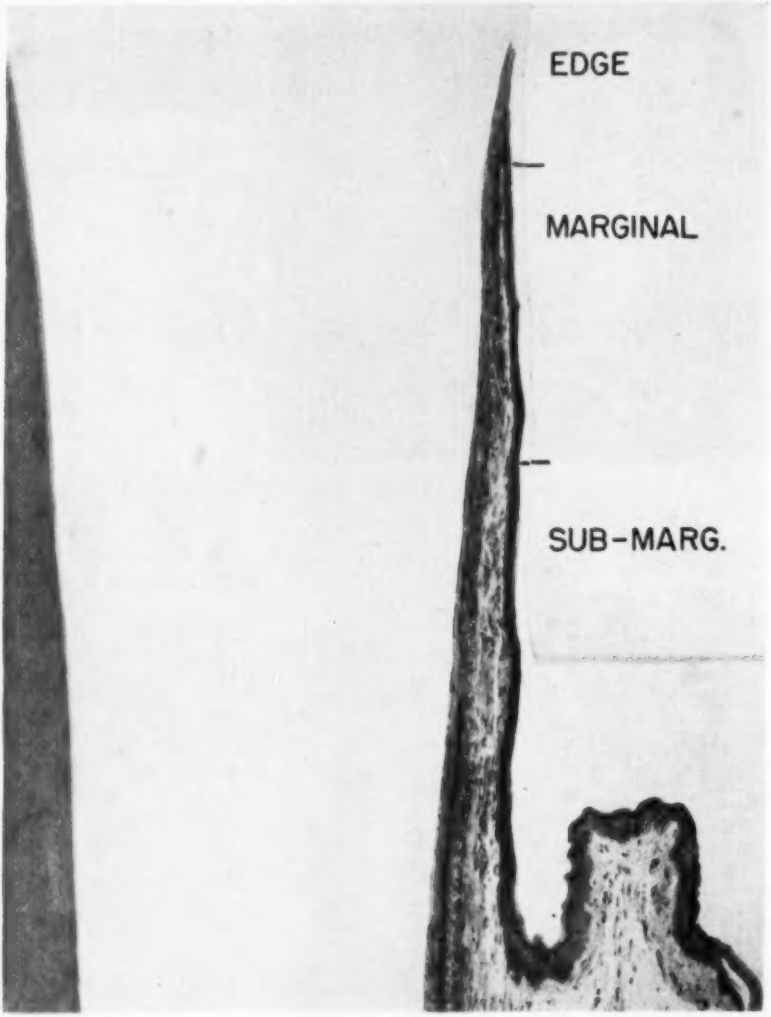

Fig. 5 • Normal labial gingiva. Low power survey showing central connective tissue core, outer and inner epithelial surfaces and avascular edge. Hematoxylin and Eosin. Original magnification X 50

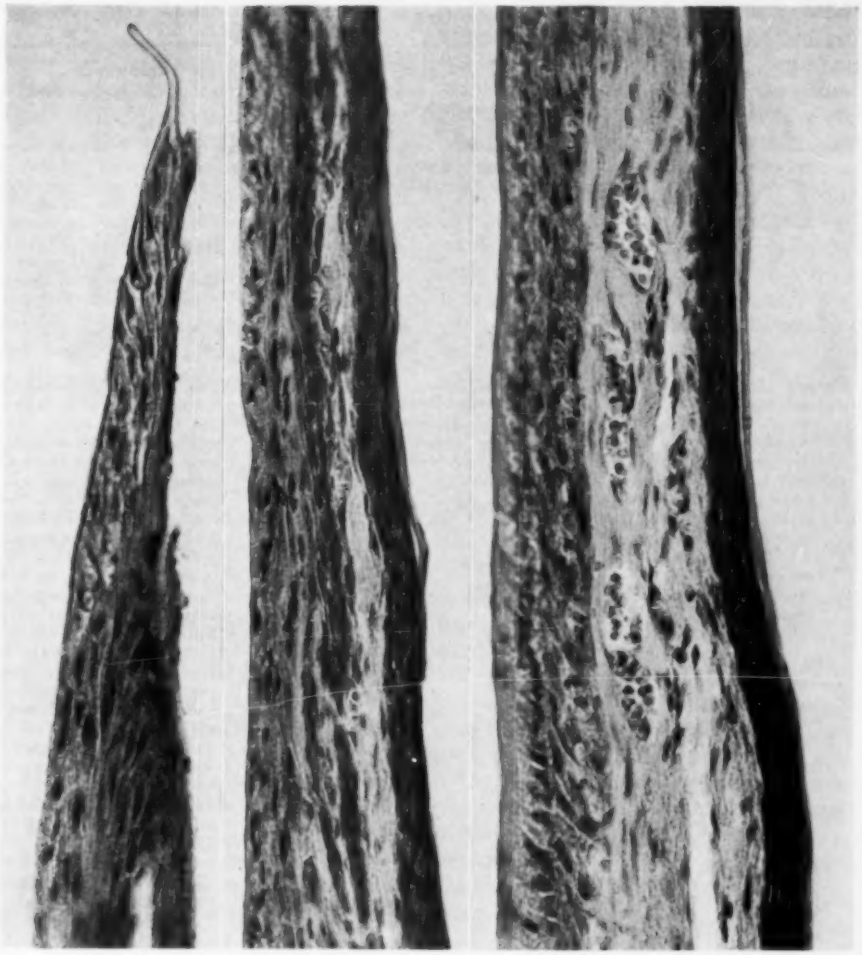

Fig. 6 • Detailed Figure 5. Left: Avascular edge zone formed by junction of outer and inner epithelial surfaces. Center: Marginal zone showing capillary outline and central epithelial strand. Right: Submarginal zone with capillaries more numerous and wider than in the marginal zone. Hematoxylin and Eosin. Original magnifications X 250

during the entire observation period. There was, however, considerable variation in the capillary pattern revealed by biomicroscopic examination. In approximately 80 per cent of the animals, the biomicroscopic appearance was sufficiently consistent to permit division of the area extending from the gingival margin to the mucobuccal fold into the following three zones: (1) edge zone, (2) marginal zone and (3) submarginal zone.

Data from this study are tabulated in the table.

Table • Description of each of the zones discernible by biomicroscopic examination and a correlation of their respective clinical and histologic features

Biomicroscopic	Gross	Histologic
Edge Zone • Superficial, linear avascular zone, the upper outline of which was barely discernible (Figs. 3, 4).	**Edge Zone** • Translucent avascular marginal knife edge approximately 1 mm. wide.	**Edge Zone** • Triangular zone consisting of stratified squamous epithelium, formed by the junction of the outer and inner epithelial surfaces of the labial gingiva. No connective tissue core or blood vessels (Figs. 5, 6).
Marginal Zone • Consisted of delicate vertical capillaries which extended from a broad underlying capillary base toward the edge zone. Just beneath the edge zone, the vertical capillaries presented terminal looping and apparent junction with adjacent capillaries (Figs. 3, 4). No other tissue outlines could be detected.	**Marginal Zone** • Pale, pink, slightly stippled zone extending from the edge zone approximately halfway to the mucobuccal fold.	**Marginal Zone** • Consisted of a central core of collagenous connective tissue contained within the outer and inner epithelial surfaces. The inner epithelium in relation to the tooth consisted of modified cuboidal columnar enamel epithelium. The outer or labial epithelial surface consisted of stratified squamous epithelium with distinct surface keratinization (Fig. 6, center). A thin epithelial strand from the edge zone extended in a vertical direction through the central core for about one-half the length of the marginal zone. A partially distended vertical capillary was seen labial to the central epithelial projection. This capillary was for the most part empty. Corpuscles could be seen only in small, isolated sections.
Submarginal Zone • Consisted of prominent, broad, smooth capillary arches (Fig. 4). These capillary arches arose from underlying horizontal vessels in the mucobuccal fold area and gave rise to vertical capillaries of the marginal zone. In addition to the capillary arches, the submarginal zone also contained numerous smaller anastomosing capillaries which also arose from basal horizontal vessels.	**Submarginal Zone** • This zone extended from the marginal zone to the mucobuccal fold and occupied the lower half of the labial gingiva. It presented a smooth, slightly stippled surface and appeared somewhat redder than the marginal zone above it.	**Submarginal Zone** • Consisted of a continuation of the central connective tissue core and lateral epithelial borders of the marginal zone (Fig. 6, right). The central connective tissue core was 2 to 3 times wider in this zone, and contained several prominent capillaries. The capillaries were generally larger than those of the marginal zone with more prominent corpuscle content.

CORPUSCLE FLOW

With the biomicroscope, it was possible to follow corpuscle movement. In the vertical capillaries of the marginal zone the corpuscles in groups of 3 to 6 moved in rhythmic spurts. In the terminal loops, the movement was rhythmic but the rate of corpuscle movement was slower. In the broader capillary arches of the submarginal zone, the corpuscle flow was less rhythmic and slightly faster than in the marginal zone. The corpuscle flow could not be recorded with the photographic equipment used in this study.

RECAPITULATION

The biomicroscope reveals capillary patterns and corpuscle flow in normal gingiva which are not detectable by simple visual examination. The biomicroscopic contours of the blood vessels are smooth and comparable to their histologic appearance. With the method of illumination employed in this study, no tissue outlines other than those of the blood vessels could be demonstrated with the biomicroscope.

The capillary distribution described above indicated division of the labial gingiva into three zones: (1) edge zone, (2) marginal zone and (3) submarginal zone. Such zoning is offered as the normal feature of the gingival capillary pattern in the albino rat. It may serve as a criterion for subsequent biomicroscopic evaluation of physiologic or pathologic capillary changes in this animal which escape simple visual examination of the gingiva. It is noteworthy that a comparable biomicroscopic zoning of the capillaries has been described in human gingiva.[7] The fact that it was possible to detect differences in the corpuscle flow in different areas of the same animal suggests a possible usefulness for this instrument in the delineation of subclinical circulatory alterations.

Mention should be made of the fact that the constancy of biomicroscopic observations is modified by such technical variables as stability of subject and apparatus, and intensity and direction of illumination.

CONCLUSIONS

A clinical, biomicroscopic and histologic study of the normal gingiva of the albino rat has been presented.

The biomicroscope reveals capillary patterns and corpuscle flow in normal gingiva which are not detectable by simple visual examination.

On the basis of the biomicroscopic appearance of the capillaries the division of the normal gingiva of the albino rat into three zones: (1) edge zone, (2) marginal zone and (3) submarginal zone, is suggested.

Treatment of Wounds • A fair estimate of a surgeon's general ability can be made from judging his methods of handling wounds. One of the first requisites of a surgeon is an accurate knowledge of how, when and where to start and to continue the treatment of a wound. And the most important information of all is the converse of the preceding, that is, when and where not to interfere with a wound. *Earl Calvin Padgett, Surgical Diseases of the Mouth and Jaws, p. 60.*

Effects of stannous fluoride, stannous chloride and sodium fluoride on the incidence of dental lesions in rats fed a caries-producing diet

Joseph C. Muhler, D.D.S., and Harry G. Day, Sc.D.,
Bloomington, Ind.

For the past few years many conscientious dentists have applied a 2 per cent aqueous solution of sodium fluoride to their young patients' teeth in an effort to prevent partially the development of new cavities. It is a fair statement that there is, in general, a 40 to 50 per cent reduction in the incidence of new carious lesions in teeth which are sound at the time of the judicious application of this compound in the manner prescribed.[1] The procedure is time-consuming for the dentist and must be repeated at intervals. Since dentistry is interested in giving the maximum service to patients, a more effective agent for prevention of caries would be of value.

Sognnaes[2] found a probable reduction of the caries attack rate when concentrated solutions of potassium fluoride were applied to the surface of the molar teeth of rats fed a caries-producing diet. His results suggested that the application of a solution containing 60,000 ppm fluoride to the right molars of rats resulted in a slight caries reduction, as compared to the untreated left molars. Cheyne[3] presented data indicating that the application of a solution containing 500 ppm fluorine as potassium fluoride was efficient in suppressing carious activity in existing lesions as well as in reducing the development of new lesions in deciduous cuspids and molars. Conflicting evidence as to the effectiveness of potassium fluoride was presented in the works of East and his co-workers.[4] They stated that the topical application of potassium fluoride, for two three-minute intervals, to newly erupted teeth of children, offered no protection from dental caries.

Calcium fluoride is being placed in certain lozenges as an agent to reduce dental decay. Although its value as such is highly doubtful, Miller[5] inhibited experimental caries development in rats by either 250 ppm of fluoride as sodium

A preliminary report of this paper was read at the 27th general meeting of the International Association for Dental Research, Chicago, June 24-26, 1949.

Department of Chemistry, Indiana University, Bloomington, Ind.

1. Knutson, J. W., Evaluation of the use of fluorine as a caries control measure: the effect of topically applied fluorides. J.A.D.A. 38:204 (Feb.) 1949.

2. Sognnaes, R. F., Effect of topical fluoride application on experimental rat caries. Brit. D. J. 70:433 (June) 1941.

3. Cheyne, V. D., Human dental caries and topically applied fluorine. A preliminary report. J.A.D.A. 29:804 (May) 1942.

4. East, B. R.; Ziskin, D. E.; Stowe, L. R.; Kershan, M., and Richardson, E. P., A study of the topical application of potassium fluoride in caries prevention. J. D. Res. 24:267 (Oct.) 1945.

5. Miller, B. F., Inhibition of experimental dental caries in the rat by fluoride and iodoacetic acid. Proc. Soc. Exper. Biol & Med. 39:389 (1938).

fluoride or 500 ppm as calcium fluoride. Bibby[6] stated that calcium fluoride was relatively ineffective in decreasing enamel solubility in a weak organic acid. Keyes and Shourie[7] demonstrated that calcium fluoride was relatively ineffective in decreasing caries activity in the molar teeth of hamsters. Because of its insolubility, it seems highly improbable that calcium fluoride could exert a very beneficial action in reducing caries.

Buonocore and Bibby[8] tested the effectiveness of various compounds in decreasing enamel solubility. Their conclusions were that the "lead ion alone or in combination with fluorine has been found to be very effective in reducing enamel solubility." At a later date, Bibby and coworkers[9] reported that at the end of one year no reduction of dental caries in children was noted in the quadrants treated with lead fluoride, whereas a similar program previously carried out in the same city using a 0.1 per cent sodium fluoride solution was accompanied by a 46 per cent reduction in new dental caries. Galagan,[10] applying lead fluoride topically as a caries reducing agent for young school children, found it to have very little value. A possible explanation has been discussed by Muhler and Van Huysen.[11]

The work of Bibby and his co-workers stimulated a great deal of research concerning the possibility of using compounds other than sodium fluoride. They demonstrated that compounds other than sodium or potassium fluoride may be of special value in reducing enamel solubility. Muhler and Van Huysen,[11] using a modification of the original method of Buonocore and Bibby, corroborated the latter's finding that certain compounds other than those containing fluoride were effective in reducing enamel solubility, but they could not confirm the findings with lead fluoride. Muhler and Van Huysen[11] showed that stannous fluoride was by far the most effective agent for decreasing the solubility of powdered enamel and dentin. Additional work by Muhler, Boyd and Van Huysen,[12] using different methods, again demonstrated that stannous fluoride is an effective agent for reducing the solubility of powdered enamel, dentin and tricalcium phosphate. Rae and Clegg,[13] while studying the solubility of various compounds, confirmed the solubility-reducing effect of sodium fluoride, ammonium oxalate, lead nitrate, silver nitrate and silver fluoride.

Manly and Bibby[14] investigated 147 compounds for their effect on the solubility of powdered enamel. They reported that 27 compounds were more effective than sodium fluoride in decreasing the solubility and 38 were less effective. Numerous compounds with the ability to reduce enamel solubility did not contain fluorine.

A great amount of investigative work has been done on this subject, and the data appear to indicate that a compound may be found which is definitely superior clinically to the accepted sodium fluoride. Since almost all of the solubility work has of necessity been done *in vitro*,

6. Bibby, B. G., Effectiveness of various fluoride preparations in reducing tooth solubility. J. D. Res. 23: 202 (June) 1944.

7. Keyes, P. H., and Shourie, K. L., Dental caries in the Syrian hamster. V. Effect of three different fluoride compounds on caries activity. J. D. Res. 28:138 (April) 1949.

8. Buonocore, M. G., and Bibby, B. G., Effects of various ions on enamel solubility. J. D. Res. 24:103 (April) 1945.

9. Bibby, B. G.; De Roche, E., and Wilkins, E. Effect of Topical Application of Lead Fluoride on Dental Caries. J. D. Res. 26:446 (Dec.) 1947.

10. Galagan, D. J., and Knutson, J. W. Effect of topically applied fluorides on dental caries experience. V. Report of findings with two, four and six applications of sodium fluoride and of lead fluoride. Pub. Health Rep. 62:1477 (October 10) 1947.

11. Muhler, J. C., and Van Huysen, G., Solubility of enamel protected by sodium fluoride and other compounds. J. D. Res. 26:119 (April) 1947.

12. Muhler, J. C.; Boyd, T. M., and Van Huysen, G., Effect of fluorides and other compounds of the solubility of enamel, dentin and tricalcium phosphate in dilute acids. J. D. Res. 29:182 (1950).

13. Rae, J. J., and Clegg, C. T. Effect of various inorganic salts on the solubility of calcium phosphate, tooth enamel, and whole teeth in lactic acid. J. D. Res. 27:52 (Feb.) 1948.

14. Manly, R. S., and Bibby, B. G., Substances capable of decreasing the acid solubility of tooth enamel. J. D. Res. 28:160 (April) 1949.

Table 1 • Composition of experimental diets

Component	Hopper-Webber-Canniff basal diet	Experimental diet used at Indiana Univ.
Ground yellow corn	60	64*
Whole milk powder	30	30
Linseed meal	6	none
Alfalfa leaf meal	3	3
Irradiated yeast†	none	2
Iodized sodium chloride	1	1

*10 per cent of the particles would not pass through a 10 mesh screen (Tyler type).
†Standard Brands, Inc., Type 360.

there is very little information on the *in vivo* effect of the promising compounds. Although the results of animal experimentation are not similar in all respects to what one may find in the human, the phenomenon as it occurs in the experimental animal should be investigated before applying it in the clinic or in general practice. Since stannous fluoride appears to be much more effective than sodium fluoride in reducing the solubility of powdered enamel and dentin, it was decided to investigate its effectiveness *in vivo,* in rats. It is the purpose of this paper to report findings concerning the effects of sodium fluoride, stannous fluoride and stannous chloride on the incidence of dental lesions in rats fed a caries-producing diet, compared with a control group receiving no added chemical agent.

EXPERIMENTAL

Over a period of 12 months a total of 448 weanling rats were separated as to sex, weight and litter mates and placed on the stock caries-producing diet. The diet used was essentially that of Hopper, Webber and Canniff;[15, 16] the modifications are evident from an examination of Table 1.

The animals were divided into six groups. Five groups were given distilled drinking water supplemented as follows: (a) 10 ppm fluorine and 31 ppm tin as stannous fluoride, (b) 2 ppm fluorine and 6 ppm tin as stannous fluoride, (c) 10 ppm tin as stannous chloride, (d) 2 ppm tin as stannous chloride, (e) 10 ppm fluorine as sodium fluoride. The sixth was a control group and received distilled water with no added supplement. The animals received the caries-producing diet and the various solutions *ad libitum*. They were kept in cages with raised screen floors. The room was air conditioned.

At the end of 140 days, the animals were killed with ether inhalations and the heads were removed. The heads were placed in 10 per cent Formalin for two days and then stored in 70 per cent ethyl alcohol. The excess soft tissue was removed and the teeth were dried with an air syringe and examined under a binocular microscope of approximately 10x magnification. The lesions were located with the aid of a small dental explorer and tabulated accurately on an examination form according to location.

The problem of fracture caries and the method of recording the number and approximate size of the carious lesions was given careful attention. On the basis of much evidence it was assumed that caries in its incipiency dissolves a microscopic fraction of the tooth on the surface of the enamel. This area of decalcification, whether on the interproximal surfaces, the labial surfaces of the upper incisors or in the fissures of the molars, usually continues its penetration until the dentin is destroyed. The carious lesion usually progresses along the dentinoenamel junction more rapidly than it destroys enamel. It is possible that a hard object brought into forcible contact with this previously undermined enamel will "fracture" this area. Al-

15. Hoppert, C. A.; Webber, P. A., and Canniff, T. L., Production of dental caries in rats fed an adequate diet. Science 74:77 (1931).

16. Hoppert, C. A.; Webber, P. A., and Canniff, T. L., Production of dental caries in rats fed an adequate diet. J. D. Res. 12:161 (Feb.) 1932.

though caries penetration on the surface of the enamel may be small, the application of sufficient force to the area may reveal large degrees of tooth destruction.

It is possible to demonstrate small areas of caries in rats on the Hopper-Webber-Canniff type diet which, in time, certainly would break down under masticatory stress and give the large lesion which sometimes appears on final examination. It was concluded, therefore, that no fractured areas were to be counted as caries unless one or more active carious lesions also could be found elsewhere in the mouth. If, for any reason, a cusp initially became fractured and later decayed, it would be counted as a carious lesion, but speculation as to the nature of the initial lesion in such instances would be useless.

The problem of differences in the size of separate cavities and the number of lesions had to be dealt with. All lesions were therefore arbitrarily classified as 1, 2, or 3; 1 being the smallest that could be detected, 2 being large enough to be readily detected, and 3 a destruction of the fissure or cusp with complete cavitation. In a preliminary analysis of the teeth, there seemed to be distinct differences between the experimental groups. The control animals (no supplement) had number 3 lesions predominantly, the sodium fluoride and stannous chloride rats had number 2 lesions predominantly, and the stannous fluoride animals had number 1 lesions. In order to determine the total number of lesions which appeared initially, it was decided that if the lower first molar, for example, was completely decayed, a total of three lesions would be recorded; for the lower second, two units; and the lower third, one unit. This classification was based on the number of prominent fissures in each respective tooth. This procedure seemed adequate, for the animals all tended to fall into one or the other of the three groups listed above when classified on the basis of the size of the cavity. Therefore, our data represent the total number of cavities observed per animal and carry the connotation of magnitude of the lesions as previously mentioned. All the teeth were examined and classified by the same investigator. In addition, three different qualified persons examined the teeth and agreed with the investigator's findings.

RESULTS AND DISCUSSIONS

The caries-protective results are summarized in Table 2. One strain included 234 rats and the other 219. In each case the period of supplementation was 140 days. The results show unmistakably that stannous fluoride in the drinking water decreased the number of carious lesions in both strains of rats and in both sexes. When present in the concentration of 10 ppm of fluorine, the percentage decrease averaged a little over 40 per cent in the different groups. The effect was decidedly superior to that of sodium fluoride administered at a comparable concentration. The sodium fluoride resulted in a decrease of approximately 20 per cent in the different groups. Even stannous fluoride at a concentration of 2 ppm fluorine had a greater caries-protective effect than sodium fluoride at 10 ppm, the over-all value for the stannous fluoride of lower concentration being a little over 25 per cent in both sexes and in the two different strains.

Such findings suggested that tin itself had something to do with the protective effect. This is indicated by the data in Table 2 from rats of both strains given 10 ppm of tin as stannous chloride in one case and 2 ppm in another. In all cases, in rats given stannous chloride the average number of carious lesions was less than in the controls receiving no supplement in the drinking water. However, the differences were well within the range of variations within the group. Therefore they may not be significant. This is further indicated by the fact that the rats given the lower concentration of

Table 2 • Comparision of the caries-protecting effect of stannous fluoride and stannous chloride with the effect of sodium fluoride in rats of two different strains fed a caries-producing diet

Supplement	Females				Males			
	Number of rats	Weight gain (Gm.)	Number of lesions	% decrease	Number of rats	Weight gain (Gm.)	Number of lesions	% decrease
Carl Wilson strain								
SnF_2 (F-10ppm)	29	160	3.9 ± 0.57*	44.3	20	258	4.2 ± 0.16*	46.2
SnF_2 (F-2ppm)	15	154	5.2 ± 0.77	25.8	11	262	4.9 ± 0.74	37.0
$SnCl_2$ (Sn-10ppm)	16	160	6.1 ± 0.71	12.8	15	282	5.3 ± 0.60	32.0
$SnCl_2$ (Sn-2ppm)	16	147	6.5 ± 0.80	7.1	12	275	5.0 ± 0.65	36.0
NaF (F-10ppm)	28	158	6.0 ± 0.59	14.4	28	245	5.6 ± 0.52	28.2
None	20	165	7.0 ± 0.46	0.0	24	239	7.8 ± 0.51	0.0
McCollum strain								
SnF_2 (F-10ppm)	19	113	5.7 ± 0.64	40.0	19	199	4.6 ± 0.14	48.4
SnF_2 (F-2ppm)	10	123	6.9 ± 0.51	27.3	12	227	6.6 ± 0.20	25.8
$SnCl_2$ (Sn-10ppm)	16	127	9.2 ± 0.50	3.1	15	235	8.6 ± 0.41	3.8
$SnCl_2$ (Sn-2ppm)	14	137	9.2 ± 0.43	3.1	14	165	8.5 ± 0.50	4.0
NaF (F-10ppm)	26	112	7.5 ± 0.94	21.0	30	196	7.2 ± 0.55	19.1
None	21	125	9.5 ± 0.52	0.0	23	184	8.9 ± 0.62	0.0

*Standard error.

stannous chloride had the same number of lesions as those that received the higher amount. Should the tin itself have a truly protective effect, rats that received the higher amount ought to have had a smaller number of lesions.

It is noteworthy that the unsupplemented McCollum strain of rats had a higher incidence of lesions than the unsupplemented Carl Wilson strain. The former had an average of 9.2 lesions per rat whereas the latter had an average of 7.4. Comparable strain differences have been observed by other investigators.[17] However the stannous fluoride protected both strains in approximately the same degree. This is significant because it suggests that genetic differences between people in susceptibility to dental caries would not be of great consequence in the use of agents such as stannous fluoride, should direct experiments with this compound prove effective in protecting any class of human subjects.

That the stannous fluoride exerted a truly protective effect is shown by a different method of analyzing the data. In this method the average number of teeth with one or more lesions in each group was determined. The system of counting did not take into consideration either the size of the lesions or the possible number per tooth. By this procedure it was found that in both strains combined the groups given stannous fluoride at 10 ppm of fluorine had an average of 3.4 affected teeth per rat; animals given stannous fluoride at 2 ppm of fluorine had 3.8; those given stannous chloride at 10 ppm of tin had 5.5; those given stannous chloride at 2 ppm of tin had 5.8; those given sodium fluoride at 10 ppm of fluorine had 5.1; and those given no supplement in the drinking water had an average of 6.0 affected teeth per animal.

In general the animals could be arranged in three main classes, both as to the size of cavities and as to the protection offered by the supplements. The animals treated with stannous fluoride had the smallest lesions and the fewest in number (Fig. 1). Following this was

17. Hunt, H. R., and Hoppert, C. A., Sex and dental caries in albino rats. J. D. Res. 27:486 (Aug.) 1948.

the sodium fluoride group, intermediate between the first and the third. The latter was composed of rats which were given either stannous chloride or no supplement at all (Figs. 1 and 2). The photomicrographs are representative of these three groups.

Because histologic examination of the tissues was difficult, sections were made only of representative arches. Because these sections were decalcified and thus had lost their enamel structure, it was impossible to study the all-important initial lesions. Nevertheless they did reveal the information being sought. Some experimental evidence indicated that no tooth is likely to fracture unless there is first cavitation.[18] The question arose whether the lesions penetrated through the dentin and into the pulp. This information was easy to obtain from the decalcified sections. There was obviously no need for a histological examination if the lower second molar was entirely decayed. Examination of many different sections confirmed the observation that the animals on stannous fluoride had lesions that were not so deep and extensive as either those on sodium fluoride or those given no chemical supplement. Three typical sections are shown in Figure 2.

18. Van Huysen, G., and Vincent, C. J., Rat caries. J. D. Res. 24:203 (June-Aug.) 1945.

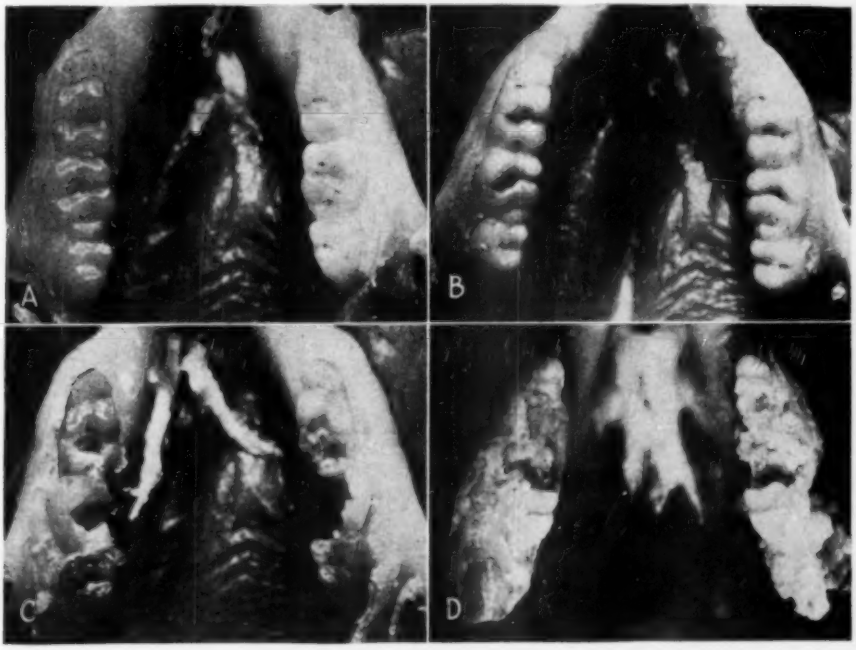

Fig. 1 • Mandibular arches of rats that were on a caries-producing diet for 140 days. During this time, animal A received 10 ppm fluorine as stannous fluoride ad libitum *in the drinking water; B received 10 ppm fluorine as sodium fluoride; C received 10 ppm tin as stannous chloride; D received no added supplement. Note the relatively small cavity in the left second molar of A as compared with B and C. These are typical findings*

In addition to the changes in the lower arch, cavities were observed in the upper first and second molars (Fig. 3). The upper first molars were by far the most frequently affected. It is interesting to note that a few cases appeared in which one of the upper first molars was completely decayed. In such cases there was a strong tendency for the opposing lower molar to be without lesions, whereas the adjacent lower teeth in that side of the arch tended to be greatly affected. This finding has been mentioned previously.[19] The foregoing is additional evidence in support of the belief[20-22] that caries in the rat is initiated by impaction of food particles in the fissures.

Neither the stannous salts nor the sodium fluoride seemed to have any toxic effect in the concentrations used. Some of the animals from each group were mated and all reproduced satisfactorily. There was no impairment of growth (Table 2) or other changes suggestive of any injurious effect.

19. Bibby, B. G., and Sedwick, H. J., Formation of cavities in molar teeth of rats. J. D. Res. 13:429 (Dec.) 1933.

20. King, J. D., Dietary factors in the production of dental disease in experimental animals, with special reference to the rat: I. Dental caries. Brit. D. J. 59:233 (Sept.) 1935.

21. Sognnaes, R. F., Studies on masticatory efficiency. I. Review of literature. Am. J. Orthodont. & Oral Surg., (Sect. on Oral Surg.) 27:309 (June) 1941.

22. Sognnaes, R. F., Studies on masticatory efficiency. II. Masticatory efficiency of rats. Am. J. Orthodont. & Oral Surg. (Sect. on Oral Surg.) 27, 383 (July) 1941.

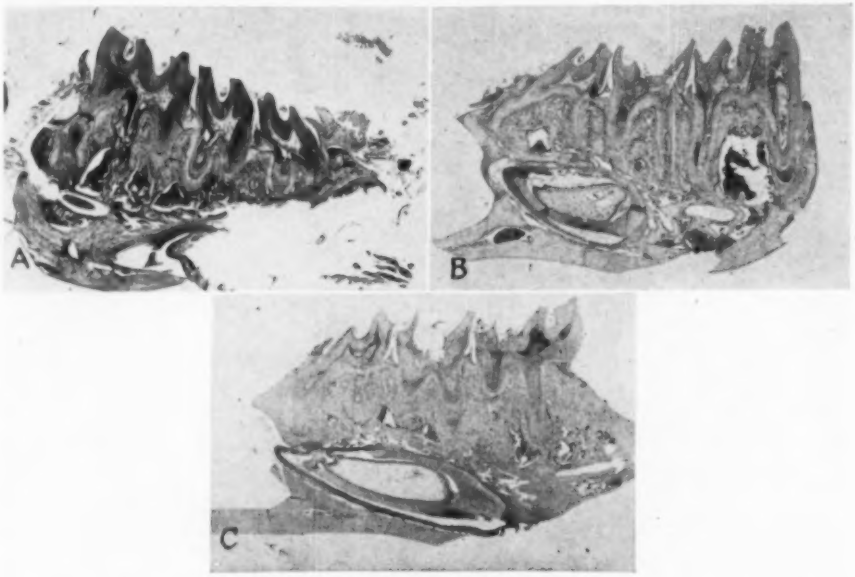

Fig. 2 • Decalcified sections of mandibular teeth of rats on a modified Hopper-Webber-Canniff diet for 140 days. Animal A received 10 ppm fluorine as stannous fluoride, B received 10 ppm fluorine as sodium fluoride, and C received no added supplement. Soundness of the dentin in A is clearly demonstrated and penetration into the pulp is obvious in B and C. Enamel was removed in the preparation of these sections. The conclusion that less cavitation occurred in the stannous fluoride animals appears justified because there was little disturbance in the dentin in these animals. These sections are representative of the experimental animals

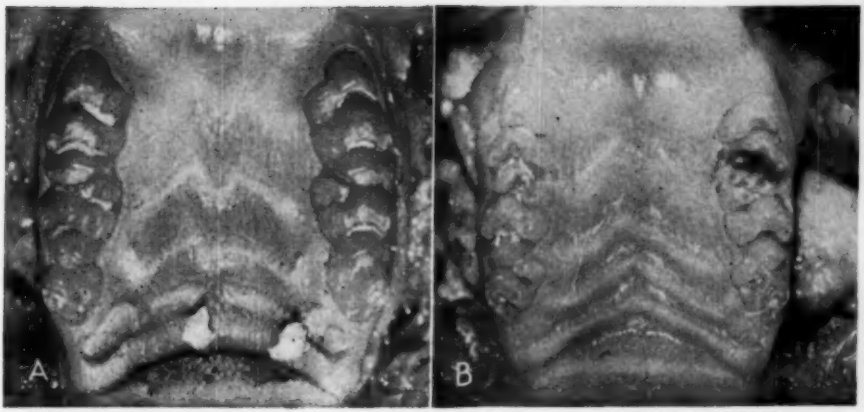

Fig. 3 • Maxillary teeth of rats on caries-producing diet for 140 days. Note relative freedom from cavitation in A. This is characteristic, although in a small percentage of animals lesions occur as illustrated in B

It is significant that this *in vivo* work parallels the findings previously reported by Muhler and Van Huysen[11] and Muhler, Boyd and Van Huysen[12] on *in vitro* studies of enamel solubility. These authors reported that stannous fluoride was by far the most effective agent to decrease the solubility of powdered enamel and dentin, while sodium fluoride had some beneficial effect, although not as much as obtained by the use of stannous fluoride.

On the basis of these findings, and the results from *in vitro* investigations already published,[11, 12] the effectiveness of stannous fluoride should be compared with sodium fluoride in the control of human dental caries. Perhaps the most useful test would involve topical applications of the two salts, comparing one with the other in effectiveness.

SUMMARY

1. Experimental dental caries was produced in two different strains of rats by a modified Hopper-Webber-Canniff diet.

2. Stannous fluoride in the concentration of ten parts of fluorine per million in the drinking water was greatly superior to sodium fluoride or stannous chloride in any concentration used in this experiment for reducing the incidence and severity of carious lesions in both strains of rats.

3. Stannous chloride did not appear to decrease significantly the incidence of dental caries. Sodium fluoride in the concentrations of 10 ppm of fluorine in the drinking water had some preventive effect on the incidence and severity of the carious lesions.

4. The lower first and second molars had the greatest incidence of decay. The upper first molar was affected in about 10 to 15 per cent of the cases with any lesions and the upper second molar was affected in but 5 to 8 per cent of all animals with any lesions.

5. Neither the stannous salts nor the sodium fluoride had any apparent toxic effects.

The need for basic principles in denture construction

Victor H. Sears, D.D.S., Salt Lake City

Basic principles and scientific methods for their application are being applied in denture construction more and more extensively.[1] By their use our patients are better assured of comfort, stability, greater degree of permanence and general satisfaction. This discussion will attempt to point out some of the principles that can be used to advantage and show how they are to be applied.

The pertinent principles and their practical application are dealt with at greater length in two books just published.[2,3] Some of the explanations will be condensed and arranged for consideration at this time.

For the present discussion we shall narrow our attention to principles of mechanics with special attention to the actions of inclined plane and lever. We shall treat of such practical matters as degree of jaw separation, forms, extent and placement of occlusal surfaces.

THE INCLINED PLANE

The action of the inclined plane is to deflect vertical force so as to produce horizontal movement. Sometimes this movement is desirable as in the case of a sled on a snow covered hill. On the other hand, horizontal movement may be detrimental as in the case of an artificial denture on its basal seat. It is the problem of the dentist-engineer to contrive all of the surfaces so that no inclined plane action will dislodge the denture bases. The phrase "force at right angle to support" should be used to test the angle of each surface involved. Let us now apply this test.

The Denture Foundations • The structure that supports the upper denture does not present a flat surface; it is irregular. Nevertheless, there is a plane that represents the general direction toward which the foundation faces. This is the "mean foundation plane."

Now the mean foundation plane of the upper jaw is essentially horizontal and the force of closure at occluding relation is essentially vertical. This meets our test of "force at right angle to support" unless we introduce errors in some other phase.

As for the mean foundation plane of the lower jaw, this can be tilted so that it lies parallel with the upper one. With the pivoting action at the condyles, too great closure would make the plane slope toward the back of the mouth; too great opening would make it slope

Presented before the Section on Full Denture Prosthesis, ninetieth annual session of the American Dental Association, San Francisco, October 19, 1949.

1. Westaway, F. W., Scientific Method. New York: Hillman-Curl, Inc., 1937.

2. Sears, Victor H., Principles and Technics for Complete Denture Construction. St. Louis: The C. V. Mosby Company, 1949.

3. Sears, Victor H., New Teeth for Old. Salt Lake City: University of Utah Press, 1949.

toward the front. Only when the upper and lower planes are parallel can there be absence of inclined plane action under closing force. This is another way of saying that there is only one mechanically correct degree of separation. That is the degree which aligns the opposing foundations parallel. We may at times depart from this mechanical ideal, but we should do so only for sufficient reasons. There is often the temptation to construct dentures at a degree of jaw separation great enough to reduce the depth of the creases around the nose and mouth. When this causes the foundation planes to diverge toward the front of the mouth, the inclined plane action will tend to shift the restoration anteriorly.

Lower Molar Slope • In the typical lower edentulous jaw, the ridge as seen from the side presents an essentially horizontal line from cuspid to and including the first molar region. At about the second molar region the ridge turns up, forming an inclined plane. Vertical force applied on this inclined plane, the so-called "lower molar slope," causes a forward thrust on the lower denture. The tendency for the lower denture to slide toward the front of the mouth because of the inclined plane action on the lower molar slope is similar in effect to that when the degree of jaw separation is too great.

The rule of "force at right angle to support" clearly calls for preventing the occlusion of the second molars. The great majority of artificial dentures now being worn are constructed in violation of this requirement. If we wish to construct dentures in harmony with this basic principle, we must routinely leave out of occlusion the second molars. This calls for a departure from nature's scheme in which second and even third molars held in bony sockets are useful chewing members. The use of these molars overlying the lower molar slope in artificial dentures shows a disregard for an important mechanical principle. Even though custom does not yet sanction the practice, the omission of these teeth from the prosthetic occlusal scheme is scientific.

The Occlusal Plane • Another surface that needs to be aligned at such an angle as to prevent inclined plane action is the occlusal plane. With the opposing denture foundations at their ideal degree of separation as described, there is only one angle at which the occlusal plane can be set to prevent inclined plane action. It is the angle that produces parallelism with the foundation planes.

If the occlusal plane were set to slope down toward the back of the mouth, for example, it would tend to shift the upper denture posteriorly and the lower one anteriorly. Furthermore, every closing force with or without interposed food would tend to carry the mandible into protrusion. It should be noted that these remarks apply only in the absence of cusps. Any locking by opposing teeth by means of cusps would prevent the inclined plane action.

Any Occlusal Surface • What has just been said about the tilt of the occlusal plane without cusps applies also to any single cusp acting as an inclined plane. We might parallel the opposing foundations and the occlusal plane to prevent horizontal thrust as just recommended and still fail to prevent the thrust if we introduce even a single cusp. The steeper the cusp incline the greater would be the horizontal thrust due to inclined plane action.

It might be argued that cusp inclines facing in opposite directions would neutralize each other. Under some circumstances this would be true, but the existence of a cusp incline any place in the occlusal scheme presents the possibility of its acting as an inclined plane. The way to observe the principle of "force at right angle to support" is to eliminate all inclines. This calls for the use of cuspless teeth.

The Denture Walls • The more or less vertical surfaces of the dentures—those areas constituted by the buccal, labial and lingual surfaces of the teeth and the dentures bases—form walls against which pressure is exerted by the tongue, lips and cheeks. We can so tilt these walls that forces exerted upon them will aid in stabilizing the dentures.

Let us consider first the lingual walls, especially those of the lower denture. If these walls were allowed to converge toward the occlusal plane, the expanding force of the tongue would tend to lift the lower denture. When, however, these walls diverge toward the occlusal plane, any widening of the tongue would tend to force the denture more firmly against its seat.

Contraction of the lips or cheeks likewise tends to seat or unseat the dentures depending on whether the denture walls converge or diverge. Although contraction of the cheeks is essentially horizontal, the bilateral action makes the resultant effect a vertical one. It is clear then that good mechanical design requires convergence of the denture walls as a means of stabilizing the dentures.

Glenoid Fossa • Since the articular surface of the glenoid fossa does not lie horizontally, any vertical force on this surface causes it to act as an inclined plane. Thus when the mandible is protruded and the condyle has advanced away from the stop afforded by the posterior wall of the fossa, any vertical force used in biting results in a posterior thrust of the mandible. This in turn tends to shift the dentures on their seats. To prevent the floor of the glenoid fossa from acting as an inclined plane under vertical muscle force it is necessary to have the condyle resting against its stop at the posterior wall of the fossa. This means that dentures should be constructed to centric jaw relation.

These are some of the principles to be kept in mind when contriving to prevent dislodgment of the dentures due to inclined plane action.

THE LEVER

Leverage in the mouth may be favorable or unfavorable, inducing stability or instability of the artificial dentures. Of the several phases of leverage affecting the stability of the dentures we shall discuss only two: relief for the hard center, and the horizontal placement of the occlusal surfaces. Control of leverage in these two particulars will do much to make dentures not only more stable but generally more serviceable.

Relief for Hard Areas • If anywhere at or near the center of the denture foundation there is a bearing area harder than the alveolar ridge, this area becomes a fulcrum, causing the denture to teeter when closing force is applied to the ridge. Such an area is the maxillary torus. The way to prevent this unfavorable leverage is to scrape a depression in that part of the denture overlying the hard area, making the depression deep enough so that the hard area will not receive the load when the ridge yields.

Relief for the maxillary torus is not new in denture construction, and the making of relief chambers is practically as old as the making of artificial dentures. However, since we are concerned with overcoming lever action that would teeter the denture, it is necessary to do more than merely scrape out a chamber with the correct outline. It is necessary in the first place to make the depth of the chamber greatest where the torus is hardest, and in the second place to make the entire chamber deeper in proportion to the yield of the ridge area. A corollary to this is that where the center area is not comparatively hard enough to act as a fulcrum, no relief should be provided.

It is not only the torus that may become a fulcrum. Sometimes the rugae zone is the least yielding area and requires

relief. Still another possible fulcrum is the anterior ridge area. Whenever this area is less yielding than the posterior parts of the alveolar ridge, relief over the anterior part of the ridge is needed. The principle to be observed is that any area under the denture base that might act as a fulcrum should be given adequate relief.

Horizontal Placement of the Occlusal Surfaces • In the scheme of occlusion requiring the elimination of cusp inclines the most important phase of leverage has to do with the horizontal positions of the occlusal surfaces with respect to the denture foundation.

The Result of Yielding Support • The fact that there is more or less yield to the soft tissues overlying the bony support makes the denture base a lever every time the patient exerts closing force at any point on the alveolar ridge. The only way to overcome this leverage completely would be to cause the patient to close on a single tooth located over the center of the denture foundation. Obviously it is not practical to place a tooth in the middle of the mouth, but such location of the occlusal surface can be more nearly attained than is ordinarily done. Since all leverage due to yield of the supporting tissues is to be avoided as much as possible, we should contrive to centralize the occlusal area as much as the other factors will permit. Especially should we aim to prevent contact of the anterior teeth when the anterior ridge is soft as well as occlusal contact of the second and third molars when they overlie soft tissue. In the typical edentulous mouth this means that in centric occlusion only the first molars and second bicuspids, and occasionally the first bicuspids, should occlude. The second molars as well as all teeth anterior to the first or second bicuspid should be out of occlusion.

This is not the plan adopted in making the great majority of dentures. In fact, only a few dentists at present are applying such means of reducing the front-to-back teetering of artificial dentures, which Hanau called the "rocking fit." This also is known as centralizing the occlusion anteroposteriorly. It is a simple and effective way of applying one of the basic principles.

Fortunately this practice of preventing occlusal contact at the anterior and posterior extremes does not call for compromise in any other particular. It happens to be the case that centralizing the occlusion to prevent leverage on the soft supporting tissue is advantageous in other particulars. Some of the attending advantages such as reducing the total pressure on the foundations, preserving the integrity of the anterior alveolar ridges, minimizing bone changes at the angle of the mandible and protecting the temporomandibular articulation have been dealt with elsewhere.[4] In short, this centralizing of the occlusion anteroposteriorly is not only good practice because of the unfavorable tendency of the denture supporting tissues to yield under closing force, but it has other advantages as well.

Leverage on the Alveolar Ridge • Quite apart from the unfavorable leverage caused by the yield of the supporting tissues, there is the danger of unfavorable leverage resulting from the incorrect horizontal placement of the occlusal surfaces with reference to the supporting alveolar ridge. In general it may be said that closing force applied outside the center of the alveolar ridge, either buccally or labially, tends to teeter the denture base; the alveolar ridge acting as a lever of the first order or scissor type.

Instead of placing the occlusal surfaces outside the alveolar ridge where they produce the unfavorable first-order leverage we can place them within the

4. Sears, Victor H., Scientific management of factors in bilateral prosthetic occlusion. J.A.D.A. 37:542 (November) 1948.

arch; that is, to the lingual side of the alveolar ridge, so that they produce leverage of the third order or sugar tong type. This is favorable leverage that tends to seat instead of unseat the denture. When we place the working occlusal surfaces to the lingual side of the alveolar ridge, it is known as centralizing the occlusion buccolingually.

From all of this it should be clear that the old scheme of occlusion that copies the forms and placement of natural teeth violates certain basic principles. This is another way of saying that suitably formed nonanatomic teeth are needed to meet the unique situation of the edentulous ridge. It was because the old scheme violates certain basic principles of mechanics that nonanatomic teeth were developed. Occlusal surfaces must be so designed and so placed that they conform to the mechanical principles involved. It is not necessary to set the entire tooth to the lingual side of the ridge. The tooth can bet set in its normal position with only the lingual part high enough to occlude.

SCIENTIFIC METHOD FOR APPLYING PRINCIPLES

Some of the basic principles have been pointed out, but there are others not mentioned, probably others not yet recognized. Scientific method for applying principles[5] will show us how to take advantage of known laws as well as lead us to the discovery of still others.

Scientific method consists essentially of adopting exact terms for clear thinking, identifying the factors involved, formulating the problem for solution and making deductions, all of which should lead us to new concepts or inventions. Scientific method is a circular process without finality. That is to say that having made deductions which may lead to invention, we start over with more or better terms where indicated, again decide on the factors to use, reformulate the problem in light of the changes, make new deductions and proceed.

The procedure of checking in this way may at first sound abstract and difficult, but one soon gains facility. This mental discipline can be a source of great satisfaction as well as a sharp tool in our work. The need for basic principles is better appreciated through a grasp of scientific method, and in turn scientific method assures more intelligent use of basic principles.

Tribune-Telegram Building

5. Sears, Victor H., Scientific method in dentistry. An original formula for its application. J.A.D.A. 30:864 (June) 1943.

Books • All that Mankind has done, thought, gained, or been: it is lying as in magic preservation in the pages of Books. . . . All that a university or final highest school can do for us, is still but what the first school began doing—teach us to read. *Thomas Carlyle, The Hero as Man of Letters.*

Principles of cavity preparation in crown and bridge prosthesis
III. The inlay abutment

L. W. Thom, D.D.S., Minneapolis

Most bridge abutments used on vital teeth in conservative fixed denture prosthesis are of the extracoronal type.

The inlay abutment, which is the intracoronal type, requires tooth structure around the retainer to retain it in position. This abutment is considered the weakest in fixed denture prosthesis, because stresses of occlusion break the cement band around the inlay much easier than they will break the cement beneath a well designed extracoronal preparation. However, the inlay abutment can be used successfully in many cases if the treatment planning is sound and the cavity preparation provides a maximum amount of retention and resistance. Extension for prevention also is necessary but special attention must be given to the placement of the occlusal cavosurface margins to prevent fracture of the cusps and disintegration of enamel margins caused by the direct stress of the opposing teeth and the torque or twist to which the bridge is subjected.

In planning the construction of a fixed bridge the operator may consider the following factors favorable to the use of an inlay abutment:

1. Where it is desirable to leave natural tooth structure on the buccal and lingual surfaces of the abutment tooth.
2. In mouths free from caries.
3. Where normal contact and a normal ridge should be maintained.
4. Where a minimum of exposed metal is desirable for esthetic reasons.
5. Where cavity preparations for former restorations may be utilized.
6. Where an extracoronal restoration cannot be used.
7. Where the length and size of the teeth are sufficient to provide adequate retention and resistance.
8. When the age of the patient is favorable.

It is wise and conservative to limit inlay bridges to short spans and to break the stress of the appliance wherever possible. The modified Black cavity preparation technic is favored because the preparation is cut into the tooth sufficiently to provide ample bulk to all parts of the retainer. This bulk minimizes the possibility of the inlay bending under stress.

Figure 1 shows the resistance and retention forms of the Black or box type

This is the third of three installments of a paper read before the Partial Denture Section, ninetieth annual session of the American Dental Association, San Francisco, October 19, 1949.

The slides from which the illustrations were made are the property of the University of Minnesota.

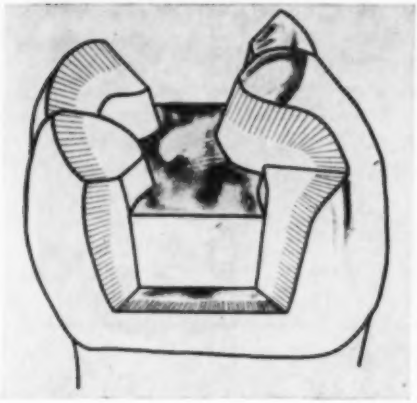

Fig. 1 • Black type inlay preparation showing the flat gingival seat and the step formed by the axial and pulpal walls

preparation, with the flat gingival seat, and the step formed by the axial and pulpal walls. If added resistance is desired, an acute angle may be used at the junction of the axial gingival walls.

An auxiliary retention, such as a spur, pin or added extension may be used to strengthen the inlay preparation. Figure 2 shows an extension of the cavity into the buccal groove. The mesiobuccal cusp has been restored to prevent fracture.

When a broken stress bridge supplying a lower second bicuspid is indicated, the cavity preparation illustrated in Figure 3 is ideal for the unsoldered end of the restoration.

The occlusal margins of the cavity should be extended well up on the buccal and lingual cusps of the abutment teeth (Fig. 4). This prevents the opposing teeth from exerting direct force on the inlay margin. The fact that the higher occlusal surfaces are smooth, makes it easier to create a better margin than if the margins were nearer the depth of the groove as illustrated in Figure 4A. If the margins are not correctly placed, the tooth structure may break down as is shown in Figure 4B. Caries follows and a pulp may be involved before it is discovered.

Figure 5, left, shows how the occlusal box form can be retained, using a long bevel to approach the cavosurface angle.

When a broken stress bridge supplying an upper first bicuspid is indicated, the distal surface of a cuspid dovetail inlay is useful for the rest lug. The cavity is prepared so that the wax pattern is drawn toward the lingual and incisal surfaces, thus enabling the inlay to meet the stress imposed on it (Fig. 5, center).

If an upper central incisor is used as part of a broken stress bridge that replaces an upper lateral incisor the inlay is made so that the wax pattern is drawn toward the lingual (Fig. 5, right). The labial wall in this type of preparation must be made carefully to avoid weak

Fig. 2 • Spur extending into the buccal groove for added retention

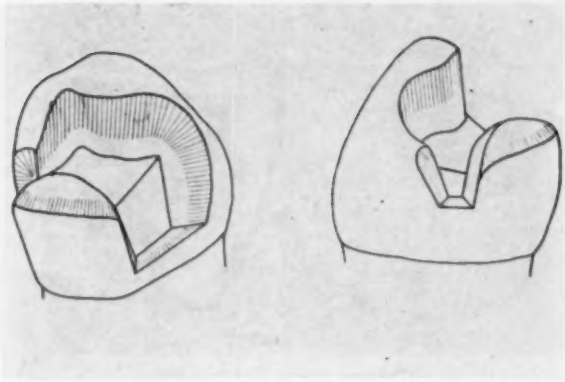

Fig. 3 • Ideal cavity preparation for inlay stress-breaker support for lower second bicuspid bridge

enamel rods on the labial surface. The dovetail (E and D) on the lingual surface is made deep enough to accommodate a place for the rest lug. The gingival wall (B) joins the axial wall at C in an acute axiogingival line angle for added resistance.

Mesioocclusodistal or mesioincisodistal inlays should be used wherever possible when inlays are considered for bridge abutments. Cautious planning and expert craftsmanship will aid the operator immensely in the use of inlay abutments. Certainly this type of abutment fills a need in fixed denture prosthesis.

Some dentists have stated that fixation disturbs the biologic function of the surrounding tissues and that fixed denture prosthesis is injurious. I disagree.

Tylman[1] said:

> If it were true that the placement of a fixed bridge produced absolute fixation of the abutment teeth, a danger might exist. This, however, is not the case because of the arrangement, the position, and structural form of the peridontal membrane. A study, extending over seventeen years, to determine tissue reaction

1. Tylman, Stanley D., Theory and Practice of Crown and Bridge Prosthesis, ed. 2. St. Louis: The C. V. Mosby Company, 1947.

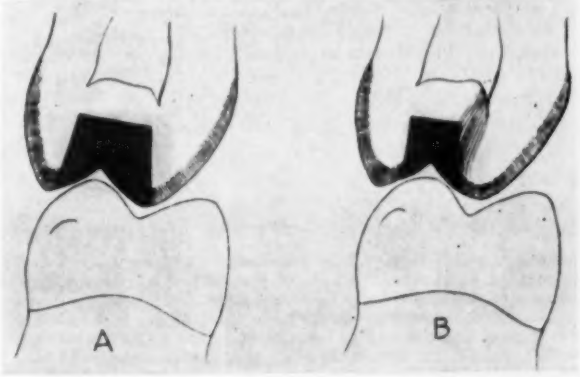

Fig. 4 • Occlusal margins should be extended high on the buccal and lingual cusps. A: Enamel rods protected. B: Enamel rods unprotected

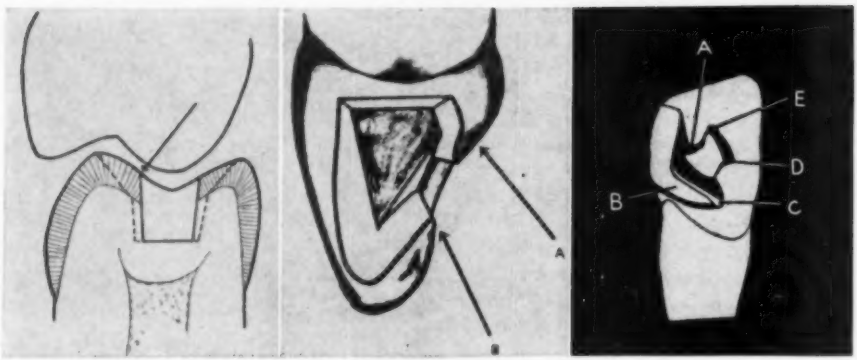

Fig. 5 • Left: Occlusal box form. Center: Cuspid dovetail preparation for broken stress bridge. Right: Central incisor dovetail preparation for broken stress bridge

to fixed bridges has shown that those teeth supporting fixed bridges receive an amount of exercise and stimulation sufficient to maintain them in a state of health. It is found that Nature very readily compensates for any slight inhibition which occurs in the movement of teeth. The entire arch, consisting of all the teeth, moves and functions in such a way that all the teeth perform as a unit in a functioning whole. We do not obtain occlusion in an individual tooth. Normal occlusion is found only when all teeth meet their respective responsibilities and duties collectively. It has been shown that it is not fixation, but the occurrence of traumatic occlusion, which is the prime cause for the loss of teeth.

Tinker[2] said in 1920:

I believe we may divide the dental profession into three classes: First, those who are partisan to the point of exclusion of all other types of reconstruction excepting fixed bridgework; second, those who are just as partisan in their adherence to the removable type of work; third, those who use both types and endeavor to apply the one which, in their judgment, is most applicable to the particular case presented.

After nearly thirty years, this division of opinion still exists, but I believe more dentists are moving into the third class mentioned. This trend is encouraging because fixed denture prosthesis as it can now be practiced, has, I believe, a definite place in oral health service. Certainly, it meets the biologic, functional and esthetic requirements sufficiently and is a comfortable restoration.

1546 Medical Arts Building

2. Tinker, E. T., Fixed bridge-work. Reprint. The Dental Summary 40:175, 1920.

Machines and Science • The dominant fact of our time is the towering place of the machine, of applied science, in the lives of mankind. And the great issue of our time, with which the peoples of the whole world will be at grips day in and day out for the rest of our lives, is simply this: Are machines and science to be used to degrade man and to destroy him, or to augment the dignity and nobility of humankind? How can men use and direct science and the machine so as to further the well-being of all men and the flowering of the human spirit? *David Lilienthal, "Science and the Human Spirit," A. L. A. Bulletin, September 1, 1946.*

Surface roughness of dental castings

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Surface roughness and size are two basic factors in the field of dental castings. Dentistry will be concerned with them as long as cast restorations are to be made. The scientific appraisal of these factors demands that they be measured. In the past, extensive studies have been conducted on the dimensional changes of materials employed in the construction of dental castings. In this article, the surface roughness of dental castings will be evaluated on a quantitative basis and the effect of some factors on the condition of cast surfaces will be assayed.

SIGNIFICANCE OF SURFACE ROUGHNESS

The surface irregularities which may occur on dental castings may be grouped under two types: surface flaws and surface roughness.

The first type includes gross surface irregularities such as localized porosity, fins and nodules. In general, they are limited to certain areas of the surface. The user of dental casting methods is familiar and concerned with these surface flaws. In some instances, the location or size of surface flaws is such as to warrant rejection of the casting. Moreover, the removal of nodules or fins is time-consuming and it results in a waste of materials. This subject cannot be covered here except to recall that surface flaws may be induced by improper spruing, incorrect investing of the wax pattern, or faulty burn-out technic. However, they should be absent in castings made with proved technics and will accordingly be excluded from further consideration.

Unlike surface flaws, surface roughness exists in all cast surfaces. Instead of being confined to certain areas, it is actually the sum total of peaks and valleys forming the surface itself. The significance of these surface irregularities lies in the fact that their size governs the relative roughness or smoothness of the surface under consideration.

The magnitude of surface roughnesses comparable to those present in dental castings is usually expressed in microinches or millionths of an inch (0.000001 inch). For instance, the average surface roughness of dental gold castings, made under the conditions to be described, is of the order of 30 microinches.

The purpose of abrading and polishing the outer surface of a cast restoration is to remove the surface roughness and thus to obtain a smooth surface for sanitary reasons, as well as to prevent irritation of the soft tissues. Hence, the size of these surface irregularities determines

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the amount of polishing necessary to produce a high finish.

On the inner surface of an inlay or cast crown, the surface roughness affects the fit of the restoration notably in connection with cavity preparations having long walls nearly parallel to each other.[1] Unquestionably, the smaller the surface roughness the more accurate will be the fit of a restoration of correct size.

Assuming that a smooth wax pattern is used, the surface roughness of dental gold castings appears to be related to the following factors: water-powder ratio of the investment mix, fineness of the investment, composition of the investment, temperature of the molten alloy and the force exerted on the molten metal during the casting.

GENERAL PROCEDURE

The following was the method pursued in this study. Standard surface wax patterns were thought indispensable to assay accurately the surface roughness of dental castings; they were constructed by pouring molten inlay wax into circular molds, 9/32 inch in diameter and 1/16 inch in depth, placed flat on a microscope slide. The wax was allowed to cool until it had lost its luster completely, whereupon the slide and molds were immersed in room temperature water. In a few minutes, the wax specimens could be removed easily without marring the surface which had been in contact with the glass slide; inasmuch as this surface exhibited a specular, glossy appearance in all specimens used, it is assumed that it could be used as a standard. Care was exercised not to touch the standard surface during the subsequent steps of the procedure. A 12-gage sprue pin was attached in the center of and perpendicular to the surface of the wax pattern opposite to the standard surface. In all instances a reservoir was provided.

The wax patterns were invested under vacuum with the vacuum equipment devised by Hollenback.[2] Unless specified to the contrary in the context, the investment molds were placed in a furnace at room temperature 30 minutes after they were invested, the temperature was raised to 1300° F. in approximately 45 minutes and the castings were made at this temperature with an air-pressure casting machine, under a gage pressure of 15 pounds per square inch. A type B dental gold alloy was used. The castings were carefully removed from the investment after quenching in water, pickled in hot hydrochloric acid and neutralized in a concentrated solution of ammonium hydroxide to remove any chlorides present. They were washed with a jet of water and examined with a magnifying glass; whenever necessary, the surface was cleaned with a camel's-hair brush. All specimens were tested as cast.

A Brush surface analyzer (Fig. 1) was employed to measure the surface roughness of dental castings. Briefly, the principle of the instrument is somewhat similar to that of a phonograph pick-up arm. A diamond stylus, with a point of 0.0005 inch radius, is allowed to travel 1/16 inch in a reciprocating motion over the surface to be analyzed. The rate of motion is 10 seconds per cycle. The vibrations of the stylus as it moves over the surface are registered electronically by the changes in potential induced in a piezo crystal in contact with the stylus. The electric impulses are registered in two ways: (1) by means of a magnetic recording oscillograph, and (2) by means of a power meter called the R.M.S. Meter, which measures the average surface roughness as the root mean square of a sinusoidal input.

The magnetic oscillograph is capable of recording surface irregularities with a maximum amplification of 40,000. The

1. Crawford, W. H., Selection and use of investments, sprues, casting equipment and gold alloys in making small castings. J.A.D.A. 27:1459 (Sept.) 1940.

2. Hollenback, G. M., Precision gold inlays made by a simple technic. J.A.D.A. 30:99 (Jan.) 1943.

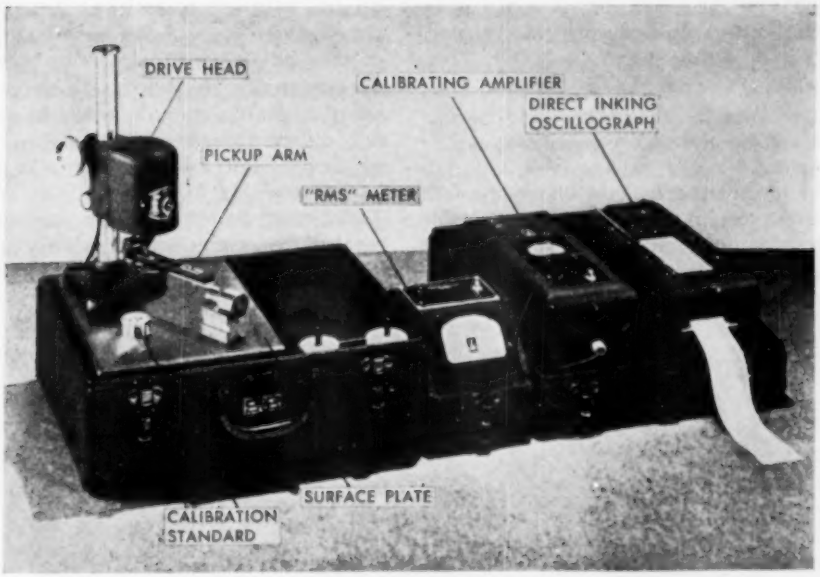

Fig. 1 • Brush surface analyzer, model BL-103. (Courtesy of Brush Development Company.)

lower graph in Figure 3 shows a recording of a typical cast surface at 4,000 magnification. For a given specimen the R.M.S. meter readings were practically the same as the average computed from the tracing recorded by the magnetic oscillograph.

The data to be presented represent the average of the readings given by the R.M.S. meter on at least three castings. The surface of each specimen was tested in at least two different directions. The accuracy of the measurements was $\pm$ 3.0 microinches.

The upper graph of Figure 2 represents the surface profile (X 40,000) of the microscope slide against which the wax patterns were poured. The readings obtained on this specimen were below 0.5 microinch. The soft surface of the wax patterns could not be tested with the surface analyzer. Nevertheless, as indicated earlier, the standard surface of the wax specimens had a mirror-like appearance and in all probability it had a smoothness very nearly that of the slide. The middle graph of Figure 2 shows the surface profile of a highly polished gold alloy casting (X 4,000); under these conditions, the surface presents waviness left by the polishing and buffing operations. The average magnitude of the waves as indicated by the meter was approximately 3 microinches.

The surface roughness of a highly polished gold alloy specimen abraded with moderate hand pressure, one minute, on a metallographic polishing paper no.00 is shown on the bottom graph of Figure 2 (X 4,000). The top graph of Figure 3 (X 4,000) shows the surface of the same specimen after being abraded in like manner on no.1 metallographic polishing paper. Under the conditions used, the order of magnitude of the values obtained for the latter specimen appears to be

equal to that of a dental gold casting from a standard surface wax pattern (Fig. 3, bottom graph, X 4,000). These values are summarized in Table 1.

EFFECT OF WATER-POWDER RATIO

At present the manufacturers of dental investments recommend different water-powder ratios. Furthermore, one investment may be used by the dentist with different water-powder ratios, according to the amount of expansion required. The effect of the water-powder ratio of the investment mix on the surface smoothness of a cast restoration was studied with two different investments, Cristobalite and Beauty-Cast. From the analysis of the results presented in Table 2, it is concluded that the thinner the mix, the rougher the casting becomes. With both investments, the smoothest surfaces were

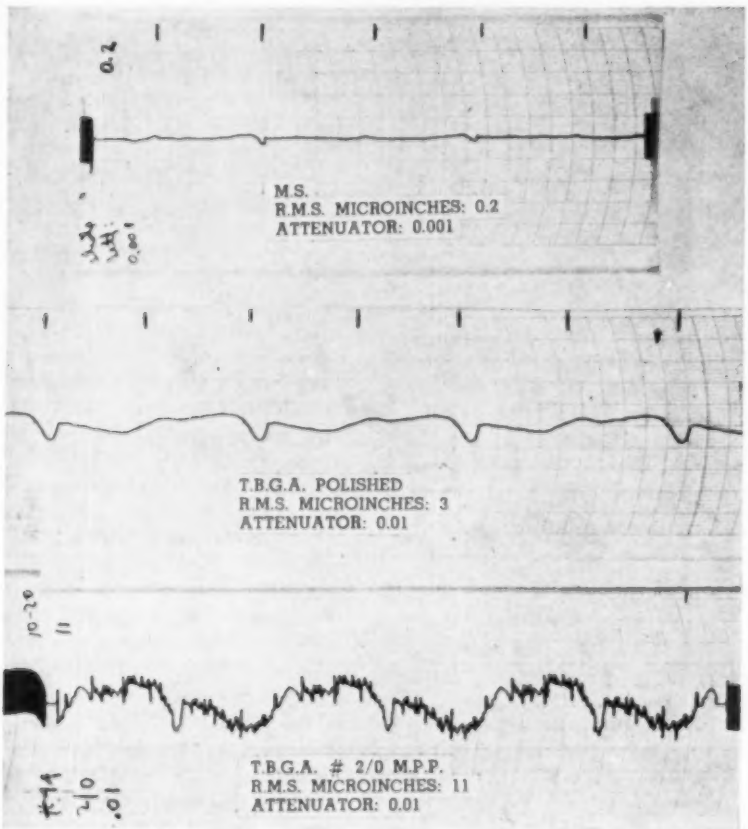

Fig. 2 • Recordings of surface profiles of three different specimens. Top, Microscope slide (X 40,000). Middle, Highly polished dental gold casting (X 4,000). Bottom, Same after one-minute abrasion on no.00 metallographic polishing paper (X 4,000)

obtained with the lowest water-powder ratios. On this account alone, it is advisable to use as thick a mix as is consistent with the amount of expansion desirable. Of course, there is a limit beyond which the thickness of the mix should not be increased because, with a mixture too thick, not only does the investment set too fast, but it is difficult to coat the wax pattern properly. Inasmuch as the water-powder ratio also affects the dimensions of the investment mold, the benefits derived from an accurate measurement of the water and investment used in any casting method are self-evident.

COMPOSITION AND FINENESS OF THE INVESTMENT MATERIAL

The possible effect of composition and fineness of the investment powder on the surface roughness of dental castings was studied by means of experimental investments containing various percentages and finenesses of both silica and hydrocal.

Two experimental investments were prepared containing the same fineness of silica but different finenesses of hydrocal. The silica used in these investments was identical to that used in investment C, Table 4. In one investment, hydrocal B base was added; 96 to 98 per cent of this hydrocal passed through a no.100 sieve and 80 to 85 per cent passed through a no.325 sieve. As far as is known, hydrocal of this fineness is generally used in dental investments at present. The average surface roughness of castings made with this investment was 19 microinches. The second investment contained a finer hydrocal, 99 per cent of which passed

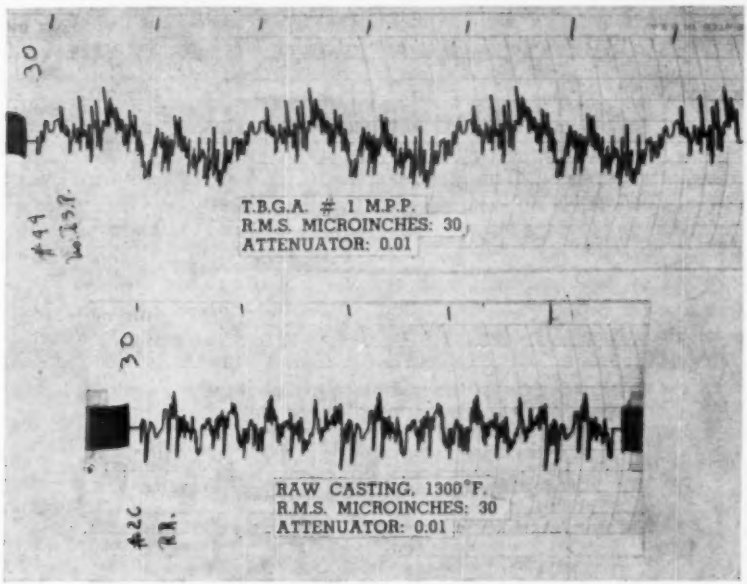

Fig. 3 • Upper graph: Profile surface (X 4,000) of highly polished dental gold casting (type B alloy) abraded one minute on no.00 metallographic polishing paper and one minute on no.1 metallographic polishing paper. Lower Graph: Typical recording of profile surface of dental gold casting as cast (X 4,000). Casting is replica of standard surface wax pattern

Table 1 • Surface analysis of different specimens

Specimen	Surface analysis (R.M.S. microinches)
Microscope glass slide	< 0.5
Type "B" cast dental gold alloy, highly polished.	3.0
After one minute abrasion on No. 00 metallographic polishing paper	11.0
After one minute abrasion on No. 1 metallographic polishing paper	30.0
Average of dental gold alloy casting, as cast, from standard surface wax patterns	28.0

through a no.200 sieve and 90 per cent passed a no.325 sieve. The castings made with this material had an average surface roughness of 22 microinches. Inasmuch as the difference in values obtained with both investments was within the limits of experimental error, no benefit is derived from using hydrocal with a finer particle size than that of hydrocal B base.

With a view to determining any possible relationship between hydrocal content of the investment and surface roughness of castings, three experimental investments were prepared. The percentage hydrocal of these investments is given in Table 3; the balance was silica of the fineness used for investment C (Table 4). The data in Table 3 show that if too little hydrocal is used, the surface of the castings is rougher than when the amount generally used in dental investments is employed.

The role of fineness of the silica content of the investment on surface roughness of the casting was studied in the following manner. Experimental investments were prepared with different grades of silica. These investments contained 70 per cent silica and the balance was hydrocal B base. Four different grades of silica were employed. The results obtained can be seen in Table 4. The coarsest silica gave castings with a surface rougher than those made with investments containing finer silica; the degree of roughness could be identified by visual inspection. However, the difference was not as great as might have been anticipated, possibly because the effect of the coarse silica on the surface of the mold might have been overcome, to some extent, by the hydrocal content of the investment.

It is to be noted that up to a certain

Table 2 • Surface roughness with various water-powder ratios of investment mixes, in R. M. S. microinches

Investment	W-P ratio 0.28	W-P ratio 0.30	W-P ratio 0.35	W-P ratio 0.38	W-P ratio 0.40	W-P ratio 0.42
Beauty-Cast	18	26	28	—	—	—
Cristobalite	—	—	—	24	32	38

Table 3 • Effect of hydrocal content of investment on surface roughness of dental castings

Hydrocal (%)	R. M. S. (microinches)
10	38
30	19
50	20

limit, the surface roughness of dental castings apparently decreases with the incorporation of finer silica in the investment. For instance, castings made with investments B and C were less rough than those made with investment A (Table 4). However, no improvement was observed when the particle size of the silica was finer than that of investment B.

Further inquiry was pursued along this line using a commercial investment as a basis for comparison. Two experimental investments were secured from a manufacturer of dental investment. Investment E_1 (Table 5) contained finer silica than the commercial formula; investment E_2 had, in addition to the fine silica, 10 per cent extra hydrocal. As far as is known, the composition of the experimental batches was identical to that of the commercial investment E (Table 5), in all other respects. The results obtained are presented in Table 5. The setting expansion and thermal expansion of investments E, E_1 and E_2 were for all practical purposes the same. The castings made with investment E_2 were approximately half as rough as those obtained with commercial dental investments (Table 6). It should be pointed out that one of the castings made with investment E_2 had a surface roughness of 12 microinches.

THERMAL EXPANSION AND HYGROSCOPIC EXPANSION METHODS

Since the advent of dental investments with a thermal expansion high enough to compensate for the casting shrinkage of dental gold alloys, the so-called "high heat technics" have been most popular among the dental profession. After the investment mold has set for about 30 minutes, it is placed in a furnace, the temperature of which is raised to cherry-red heat between 1200° and 1400° F. and the alloy is cast. The purpose of the heat treatment is twofold: (1) to eliminate the inlay wax and (2) to produce the necessary thermal expansion of the mold. This method has decided advantages; for example, the thermal expansion of dental investments has been standardized and the equipment utilized is simple—a plaster bowl, a plaster spatula, and any type of furnace or gas burner yielding a temperature of about 1300° F.

Table 4 • Surface analysis with various sizes of silica particles

Investment	Per cent retained silica				Surface analysis (R.M.S. microinches)
	Sieve* no. 60	Sieve* no. 100	Sieve* no. 200	Sieve* no. 325	
A	0.0	60.0	98.0	99.7	36
B	0.0	0.0	4.3	17.6	22
C	0.0	0.0	0.7	6.7	19
D	0.0	0.0	0.0	0.3	22

*U.S. Standard

Table 5 • Average surface roughness with varying formulas of one commercial investment

Investment	Surface analysis (R.M.S. microinches)
E (unmodified)	26
E_1 (with silica passing no. 325 sieve)	22
E_2 (with silica passing no. 326 sieve plus 10% more hydrocal)	16

However, it has been the experience of some dentists that castings made with a thermal expansion technic exhibit rough surfaces. Heating the mold to lower temperatures has been suggested as a remedy and some speculation has been centered on this matter. Since the discovery of the hygroscopic expansion of dental investments, it has been possible to compensate for the shrinkage of dental gold alloys using low heat technics.

Remarkable accuracy is generally credited to dental castings constructed with hygroscopic expansion procedures. Seemingly, the results so obtained have been related, in part, to the smoothness of the cast surfaces. It has been suggested that either the boiling of the inlay wax under dry heat[2] or the exposure to temperatures used with thermal expansion technics roughens the investment mold.[3] Thus far, the basic issue of whether the two methods of mold expansion are factors involved in the surface roughness of dental castings has not been subjected to critical investigation.

Table 6 shows the average roughnesses of dental gold alloy castings made with both thermal and hygroscopic expansion technics.

The thermal expansion procedure was followed as outlined earlier in this article. From the investments used with the thermal expansion method, four were selected for use with the hygroscopic expansion technic. The latter was utilized as advocated by Hollenback.[2] After investing, the molds were immersed in a water bath at 37° C. for one-half hour, the inlay wax was eliminated in boiling water with an aspirator adapted to the investment mold, and the latter was heated to a temperature between 800° and 900° F. for at least 30 minutes.

The results tabulated in Table 6 indicate conclusively that castings made with a hygroscopic expansion technic are not smoother than those obtained with a thermal expansion technic. For all practical considerations, the average surface roughness obtained with the two procedures is the same when using the four investments indicated.

Many of the misconceptions regarding the relative smoothness of dental castings have been dependent on their appearance to the eye rather than on the actual surface condition of the castings. In spite of a common tendency to believe that the surface roughness of dental castings can be observed easily by visual inspection, the fact remains that this method is often misleading. In other words, the surface appearance as observed by the

3. Scheu, C. H., Practical suggestions on inlay construction. J.A.D.A. & D. Cos., 24:100 (Jan.) 1937.

Table 6 • Surface analysis (R.M.S. microinches) of dental gold alloy castings made by hygroscopic and thermal expansion methods

Investment	Hygroscopic expansion method	Thermal expansion method*
Beauty-Cast	30	26
Baker Scientific Universal	26	26
Steele's Super Investment	32	29
Supermold	32	28
Ransom & Randolph Gray	—	27
Cristobalite	—	29
S.S. White no. 30	—	26
Coecal Universal	—	26
Average	30	27

*Investment mold heated to 1300° F.

reflection of light to the eye is not necessarily indicative of surface roughness.

For example, macroscopic grain formations may reduce the reflectivity of the surface, and thus may produce an appearance of roughness which does not exist. Moreover, unavoidable discolorations may also occur so as to give a visible appearance of a rough surface. Castings made with different investments available on the market may differ substantially in appearance, although the actual surface roughness may be practically the same. At the beginning of this study, photomicrographs were taken of different castings and they were found of little value as a basis for judging surface roughness.

Another factor which probably enters into this problem is the ease with which the investment can be removed from the castings. For instance, the investment in some cases adheres tenaciously to the gold alloy, and any minute particles left inadvertently on the casting are likely to cause a roughened appearance. By contrast, when the investment can be separated easily, the casting may exhibit a cleaner and seemingly smoother surface. The possible presence of traces of carbon in the investment mold may be a factor in this connection.

Finally, it should be pointed out that some investments are more effective in providing a reducing atmosphere during the casting, and thus, all other factors being the same, yield castings with a cleaner surface than other investments do. For instance, the castings obtained with Ransom and Randolph Gray investment, Beauty-Cast and Steele's Super investment had, as a rule, a clean and apparently smooth surface. On the other hand, those obtained with S. S. White investment no.30, Coecal Universal investment and Kerr cristobalite investment for inlays, oftentimes exhibited a dark, discolored surface which might have been thought to be rougher than the others. And yet, an inspection of the data on Table 6 reveals that the castings made with the above investments had the same surface roughness. In fact, all the investments used with the thermal expansion technic produced practically the same surface roughness on dental gold alloy castings (Table 6).

EFFECT OF WAX ELIMINATION

In general, with existing technics, it is desirable to allow a 30-minute set of the investment mold before eliminating the inlay wax in order to insure sufficient strength of the investment mold.

As indicated before, with thermal expansion technics the wax is eliminated by dry heat, whereas with the hygroscopic expansion procedure, as suggested by Hollenback,[2] the wax is aspirated from the mold while it is immersed in boiling water.

The possible effects of both methods of wax elimination on the surface of the castings was studied. In those instances where the wax was removed in boiling water, the mold was subsequently placed in a room-temperature furnace; the latter was heated to 1300° F. and the alloy cast. Hence, the mold was treated as for a high heat technic. Moreover, it was thought desirable to observe the possible effects of a severe and abrupt elimination of the wax through sudden insertion of the investment mold in a furnace at 1300° F.

The data secured with two dental investments are tabulated in Table 7. The over-all averages suggest that there is little, if any, significant difference on surface roughness when any of the above mentioned technics is used, as long as the inlay wax is thoroughly eliminated.

It is interesting to observe that the investment molds made with Beauty-Cast investment showed a tendency to fracture when placed directly in a furnace at 1300° F. On the other hand when Ransom and Randolph Gray investment was used, no damage of the mold was pro-

Table 7 • Surface roughness (R.M.S. microinches) with various methods of wax elimination

Investment	Conventional method*	Wax aspirated in boiling water*	Investment mold placed in furnace at 1300° F.
Beauty-Cast	26	26	32
Ransom and Randolph Gray	27	28	25
Average	26	27	28

*Investment mold placed in room temperature furnace, heated to 1300° F.

duced by this severe burn-out treatment. This difference in behavior may be partly accounted for by the fact that the water-powder ratio used for Ransom and Randolph Gray investment was 0.28; whereas that used for Beauty-Cast was 0.30. It seems as though the strength of the investment mold is desirable not only to provide a smooth surface on the casting, but also to decrease the likelihood of fracture under severe conditions.

COMPOSITION OF THE GOLD ALLOY

As is well known, inlays and cast crowns must meet different specifications depending upon the individual requirements of the case at hand. Accordingly, soft, medium and hard gold alloys are available for dental purposes. In order to establish whether any differences in surface roughness of castings are related to the composition of the alloy, castings were made with two experimental gold alloys and also with pure gold. The wax patterns were invested with Ransom and Randolph Gray investment and the conventional thermal expansion method was utilized.

The formulas of the alloys compounded as well as the surface analysis of the corresponding castings are included in Table 8. Data on surface hardness are also included in this table. From the findings obtained, it follows that the surface condition of dental castings is irrespective of the composition of the gold alloy used. As may be observed from Table 8, castings made with pure gold, a soft gold alloy, and with a gold-platinum alloy (Type C), have the same surface roughness within the limits of experimental error.

CASTING OF THE GOLD ALLOY

The surface roughness of cast gold alloys may be affected by the temperature at which the alloy is cast into the investment mold and by the magnitude of the force applied in casting.

Table 8 • Surface analysis with various compositions of gold alloy

Composition (% by weight)		Surface hardness, softened condition* (B.H.N.)	Surface analysis (R.M.S. microinches)
Gold	100	17	26
Gold	91.66	32	29
Silver	7.34		
Copper	1.00		
Gold	73.00	122	28
Silver	10.00		
Copper	10.00		
Platinum	3.00		
Palladium	3.00		
Zinc	1.00		

*Specimens quenched in room temperature water from 1290° F.

Table 9 • Surface analysis (R.M.S. microinches) of dental gold alloy castings made with two types of casting machines

Investment	Casting technic	Air pressure casting			Centrifugal casting	
		10 lbs. per sq. inch	15 lbs. per sq. inch	22 lbs. per sq. inch	2 turns	5 turns
Beauty-Cast . .	Hygroscopic expansion	28	30	37	25	39
Ransom and Randolph Gray	Thermal expansion	28	27	37	29	41

Several castings were made with two different investments, Beauty-Cast and Ransom and Randolph Gray. In some of the tests, the gold alloy was melted with a gas-air torch and in others with a gas-oxygen torch. The temperature of the gold alloy was measured with a potentiometer. With a gas-air torch, the gold alloy was heated to the lowest temperature necessary to secure a complete casting; the temperature of the alloy did not exceed 1820° F. The surface roughness of the castings obtained was 27 microinches for Ransom and Randolph Gray investment and 30 microinches for Beauty-Cast investment. A new series of castings was made and this time the gold alloy was melted with a gas-oxygen torch. The alloy was heated until it had a white, brilliant color. The temperature of the alloy was at least 2200° F. Visible roughening of the castings obtained in this manner was observed. The average surface roughness of the castings made with Beauty-Cast investment was 42 microinches and that of the castings made with Ransom and Randolph Gray investment was 49 microinches. In dental practice very often the gas-oxygen torch is used carelessly and the gold alloy is overheated. As evidenced by the data herewith presented, an overheating of the gold alloy roughens the casting, possibly through damage inflicted to the surface of the investment mold. The use of a gas-air torch is satisfactory to melt gold alloys, and it is to be preferred to the gas-oxygen torch. The increase in temperature of the gold alloy is very rapid when the latter is used, and the inexperienced operator is likely to overheat the alloy. With the gas-air torch, this hazard is considerably lessened. Regardless of the type of fuel used in the torch, the alloy should be cast as soon as it is completely fluid and exhibits an orange-yellow color. It should be emphasized that all factors related to the proper melting of the alloy deserve constant attention on the part of the dentist.

The surface roughness of dental castings made with two types of casting machines was also studied. Three series of castings were made with an air-pressure casting machine using gage pressures of 10, 15 and 22 pounds per square inch respectively. Two further series of castings were made with a centrifugal casting machine; one series was obtained when two turns of the arm was used, and another with five turns. The results obtained with Beauty-Cast and Ransom and Randolph Gray investments are presented in Table 9. There appears to be a roughening of the casting when excessive force is used to cast the gold alloy, irrespective of the type of casting machine employed. Consequently it is advisable not to use

any more force than is necessary to obtain satisfactory results. In the case of the air-pressure casting machine, a gage pressure of about 15 pounds per square inch seems sufficient and safe to cast inlays and crowns. With a Kerr centrifugal casting machine, two to three turns of the arm provide the necessary force to cast inlays and crowns properly. Higher casting forces should be used only when considered absolutely necessary.

CONCLUSIONS

The surface roughness of dental gold alloy castings has been measured with a Brush surface analyzer. From the data obtained, the following conclusions are reached:

1. The surface roughness of dental castings made with eight different commercial investments was for all practical purposes the same.
2. With four dental investments no significant difference in surface roughness was observed between castings made with a hygroscopic expansion technic and those made with a thermal expansion technic.
3. The surface roughness of dental castings is affected by the particle size and percentage content of the silica of the investment. Evidence was presented in regard to the possibility of improving the surface of the cast restoration by using, in the investment, silica of the proper particle size and amount.
4. The surface roughness of dental castings is independent of the composition of the gold alloy.
5. The surface roughness of dental castings is affected by the water-powder ratio. Within practical limits, low water-powder ratios give smoother castings than higher water-powder ratios.
6. The surface roughness of dental castings appears to be independent of the method of wax elimination, provided the wax is eliminated completely.
7. The surface roughness of dental castings is affected by the temperature of the molten alloy. Overheating of the gold alloy roughens the surface of the castings.
8. The surface roughness of dental castings is affected by the magnitude of the force used to cast the gold alloy into the mold. This effect is independent of the type of casting machine used. Excessive casting forces are likely to roughen the surface of the casting.

Vacations • We are interested in vacations because of their benefits to health and well-being. If their beneficial effects can be enhanced and they can produce more physical and mental endurance, less rigidity of attitude, and freedom from the accumulation of mounting fatigue; if vacations each year can dispel the ennui and physical fatigue and renew interest in the year's work ahead, then to some extent breakdowns can be averted. To be sure, breakdowns do not come because one fails to take a vacation; there are many factors involved; but a proper vacation in a well-ordered life will go far to prevent them. A vacation, all other factors being reasonably equal, will go a long way in maintaining health. A change of scene, a constructive activity, rest and relaxation will be a re-creating force in the year-to-year routines. *William A. Sawyer, M.D., "Vacation Policy Trends," Industrial Medicine and Surgery 19:295, June 1950.*

Causes of errors in roentgenographic interpretation

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The interpretation of roentgenograms is one of the most important steps in diagnostic procedure and it is so easy to misinterpret a dental roentgenogram that a thorough understanding of each factor governing their production and interpretation is of paramount importance to every dentist.

The accompanying illustrations of roentgenograms briefly portray some of the common causes of errors in the interpretation of oral roentgenograms and will be a fitting prelude to a discussion of those factors which will assist the dentist to eliminate the grave danger that exists in attempting to interpret faulty roentgenograms.

Figure 1A shows elongation. The film is readable only to the crest of the ridge, but the apexes of the roots are not shown because of bending of the film.

Figure 1B shows distortion and overlapping. Note the somewhat windblown appearance due mainly to the wrong horizontal angulation of the roentgen rays and slight bending of the film.

In Figure 1C the film was poorly placed, and improper fixation and washing make guesswork the basis of the interpretation.

In Figure 1D the mottled, fogged appearance is due to use of old film. Check date of manufacture or date by which the film is to be used. Don't keep old films.

Tube or patient moved and detail is lost completely (Fig. 1E).

In Figure 1F the film was left overnight or too long before development. The operator should always wipe film packs thoroughly after exposure, and develop the films as soon as possible.

Figure 1G shows one of the results obtained when developing solutions are too warm. The appearance is similar to that of the surf breaking on the shore, or may be described as mirage like.

This is not a fractured tooth but an artifact caused by static electricity (Fig. 1H). Note root fragment in the third molar area, and that the apexes of the second molar roots are not shown.

Figure 1I shows fogging, another cause of error in interpretation.

FACTORS IN ROENTGENOGRAPHIC INTERPRETATION

The foregoing are but a few of the many errors[1] that cause faulty interpretation of dental roentgenograms, and lead to the consideration of the factors upon which

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1. McCall, J. O., and Wald, S. S., Clinical Dental Roentgenology: Technique and Interpretation, ed. 2. Philadelphia and London: W. B. Saunders Company 1947.

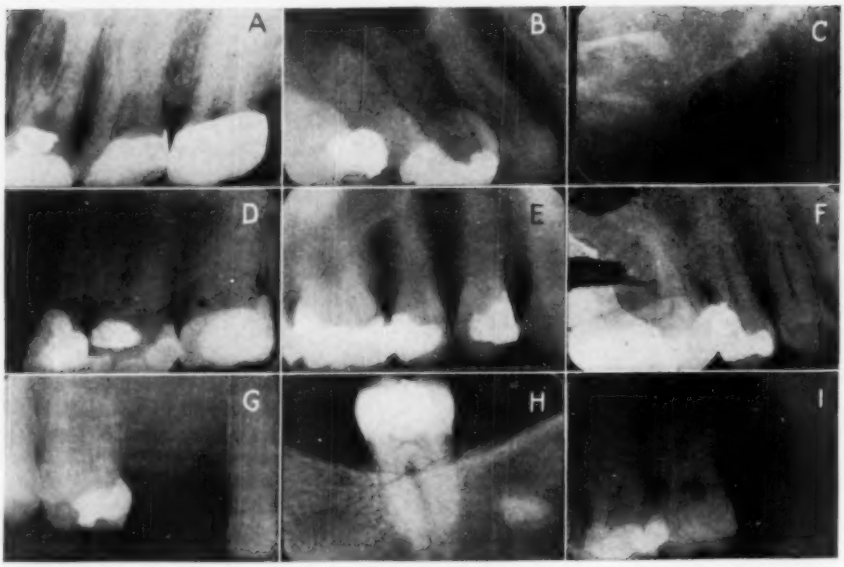

Fig. 1 • Some of the common causes of errors in the interpretation of oral roentgenograms. They are discussed in the text

the ability to interpret dental roentgenograms depends. These factors are:

1. Knowledge of what constitutes a satisfactory, readable roentgenogram.
2. Care in the production of good roentgenograms.
3. Ability of the diagnostician to recognize the roentgenographic appearance of abnormal or diseased tissue structures and to differentiate between abnormality and disease.

Each of the factors is discussed in an endeavor to outline a rational procedure for the general practitioner.

Factor 1 • Simpson[2] has most aptly described a good dental roentgenogram.

It should

1. Cover the field of examination to the best advantage.
2. Show no evidence of mobility during exposure.
3. Show a diagnostic view of the region with a minimum distortion of the image.
4. Show maximum definition and contrast consistent with penetration of the structure.
5. Be free from stains and abrasions.

Analyzing this statement brings a realization of the importance of possessing the ability to produce such a roentgenogram.

Factor 2 • The possession of an x-ray machine does not endow the owner with the ability to use it intelligently. To acquire this ability he must understand the varying degrees of density or penetrability of the tissues examined and know how to control the penetrating quality of the roentgen rays.[3]

Thorough understanding of the technic of film exposure is also necessary. This includes film placement, angulation of the

2. Simpson, C. O., Technic of Oral Radiography, ed. 2. St. Louis: C. V. Mosby Company, 1928.

3. Fixott, H. C., The value of radiodontic examinations in restorative and preventive dentistry. J. California D. A. 14:37 (March-April) 1938.

roentgen rays, time of exposure and the understanding of the difference in effect of changes in milliamperage and voltage.

Film Quality and Type • In addition to a knowledge of how to control the roentgen rays the dentist must also understand the varying results to be obtained by the quality and type of film used. This requires exhaustive experimentation by the operator to enable him to secure results best suited to the requirement of each particular case.

For the average use in the general practitioner's office the slow, single emulsion, fine grain film is preferable since it gives sharper detail and greater differentiation of densities.

Long Cone Technic • For the longer target film distances, used by many in order to obtain greater anatomic accuracy,[4] fast or ultra speed films are preferred in order to reduce time of exposure and prevent distortion of image by movement of the patient.

Dark Room Technic • This is a consideration of primary importance in film development and care. Improperly developed films are the basis of many errors in interpretation; use of old solutions, of solutions too hot or too cold and carelessness in handling can make dental roentgenograms a liability instead of an asset in diagnosis, as indicated in some of the illustrations.

Factor 3 • This has to do with the ability of the dentist to recognize the roentgenographic appearance of normal tissue structure and is of primary importance.

Only by painstaking study and experience can the general practitioner familiarize himself with the roentgenographic appearance, position and importance of normal anatomic structures and landmarks. The roentgenograms in Figure 2 will emphasize this fact.

Figure 2A shows the roentgenographic appearance of normal alveolar tissue and tooth structures. Note (a) cancellated bone; (b) cortical plate; (c) lamina dura; (d) periodontal membrane; (e) gingiva; (f) enamel; (g) dentocementum; (h) pulp chamber and canal, which in this case show recession. Other soft tissue shadows may be encountered such as the lips and buccal tissue (especially the fold at the line from the alae of the nose past the corner of the mouth).

Many do not realize that the dark or rarefied area to the anterior is not owing to pathology, but to this shadow and the natural thinness of the bone in the region (Fig. 2B).

More commonly seen anatomic landmarks of the maxilla that enable the interpreter to recognize the location of the film are in the posterior of the maxilla.

Figure 2C shows: (a) hamular notch and process; (b) tuberosity; (c) coronoid process; (d) maxillary sinus. The zygomatic process and zygomatic maxillary suture can often show as a shadow easily mistaken for a root fragment (Fig. 2D). This mistake can be eliminated by taking roentgenograms from different angles and moving the confusing landmark from this location.

The junction of the nasal fossa and antrum usually shows in the cuspid region and can be considered as an inverted Y (Fig. 2E).

Figure 2F shows: (a) nasal fossa; (b) incisive foramen; (c) maxillary suture. These landmarks are often seen in the central film, when it is taken directly through the nose as this is. Notice the shadow of the nares, as well as the forementioned landmarks.

In the mandible the more commonly seen anatomic structures often mistaken for abnormalities are (a) rarefied or thinned area in which is usually found the (b) mandibular canal below the dense (c) mylohyoid and (d) external oblique ridges (Fig. 2G).

4. Fitzgerald, Gordon M., Dental roentgenography. II Vertical angulation, film placement and increased target film distance. J.A.D.A. 34:160 (Feb.) 1947.

The mental foramen owing to its shifting location and varying shape is often misinterpreted; additional films proved this to be an abnormally shaped and located foramen (Fig. 2H).

In some patients' mouths the genial tubercles are not very heavy and the lingual foramen may be pronounced (Fig. 2I). Palpation of the area discloses a deep V-like depression to the lingual.

Having become familiar with the roentgenographic appearance of normal tissues the diagnostician must recognize the roentgenographic appearance of abnormalities, of tissue changes brought about by trauma, surgical interference, disease, and so forth.

Most dentists are familiar with the appearance of the changes wrought by chronic periapical lesions, but some of

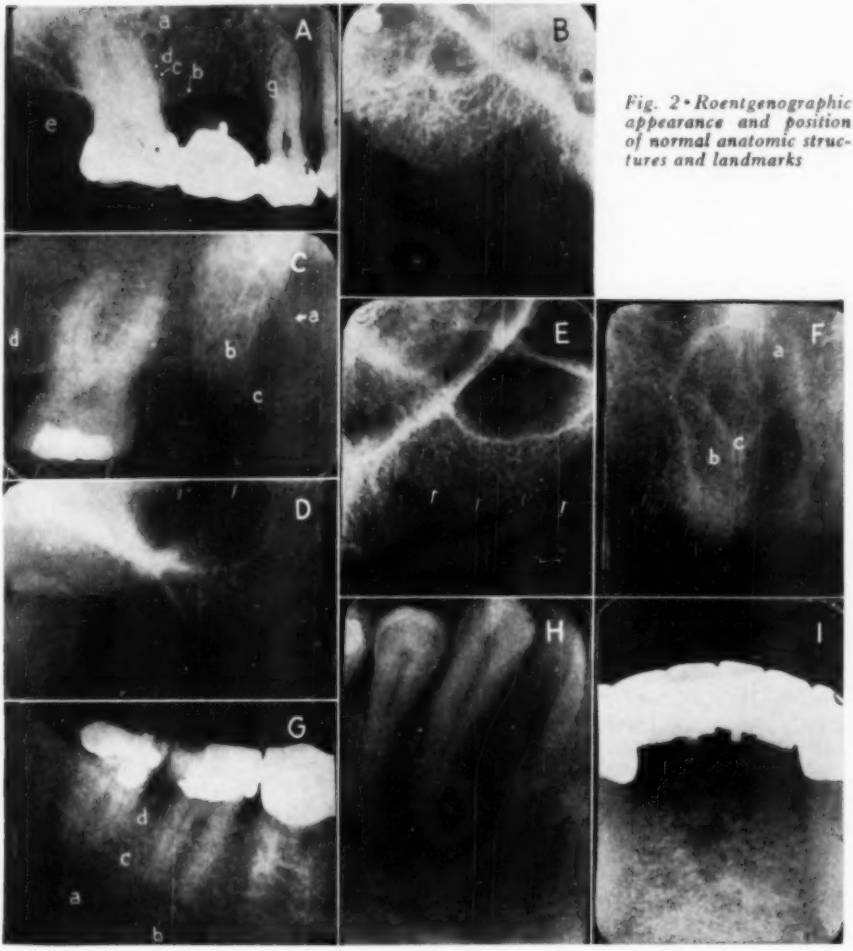

Fig. 2 • Roentgenographic appearance and position of normal anatomic structures and landmarks

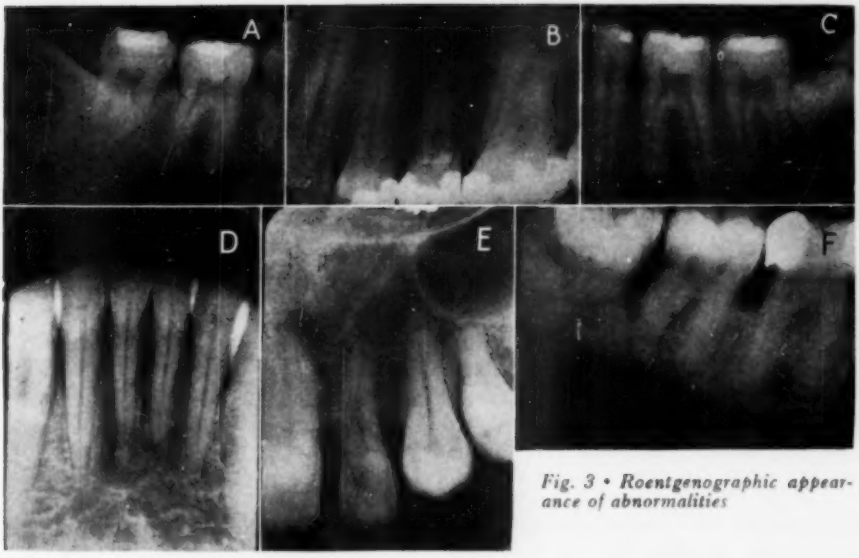

Fig. 3 • Roentgenographic appearance of abnormalities

the earlier stages are more difficult to recognize. Figure 3A is an illustration of an acute reaction that has destroyed but little of the process.

Figure 3B shows a small area of granulation that is near the density of the process. Note, however, the outline of the periapical region is irregular.

To determine the condition of these last two illustrated areas it may be necessary to use the pulp tester, and consider the clinical symptoms and history.

A common error made in interpretation of periapical conditions is in mistaking incompletely formed teeth for teeth with periapical involvement (Fig. 3C).

Many teeth with fibrocementomas or ossifying fibromas are erroneously classed as infected teeth.

Both teeth shown in Figure 3D should be thoroughly tested for vitality, and other diagnostic methods should be used before reaching a final conclusion.

If films are properly placed and exposed the early destruction of the investing tissue can be detected (Fig. 3E). The breakdown of the cortical plate in the interdental spaces indicates gingival irritation which leads to more advanced periodontal disturbances.

Periodontal changes are often ignored until tissue destruction is advanced and prognosis poor (Fig. 3F).

Commonly mistaken for root fragments are areas of sclerotic bone. Many times such areas as the one seen in Figure 4A have been operated on uselessly. Note the way the trabeculae join the area of density. Ordinarily a root fragment will be definitely outlined by periodontal membrane as in Figure 4B, or a root fragment with an area of low grade infection with no definite line of demarkation may be seen (Fig. 4C).

With impacted third molars the dentist is often in too much of a hurry to remove the early developing bud because of the angle at which it appears to be developing or moving. However, they often come

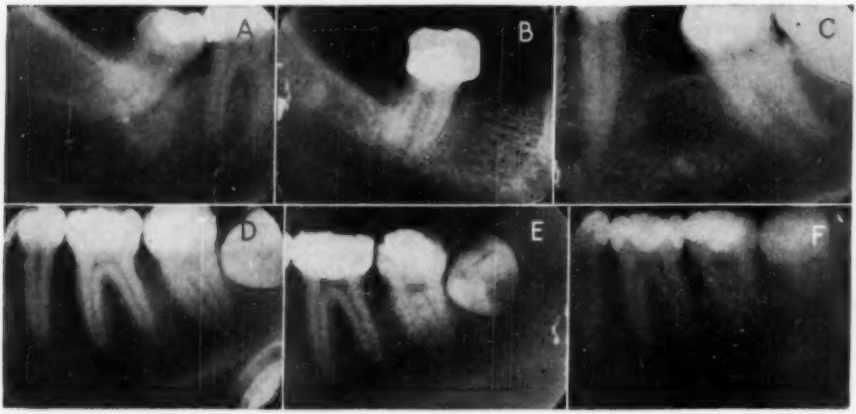

Fig. 4 • Other examples of abnormal conditions with which the dentist must be familiar

more nearly into normal occlusion than would seem possible (Fig. 4D, E and F).

CONCLUSIONS

1. Lack of knowledge and care in the production and preparation of dental roentgenograms is a primary factor in the cause of erroneous interpretation of dental roentgenograms.

2. The dentist must be thoroughly familiar with the appearance of the normal as well as the abnormal, and have good, new references at hand to properly interpret good films.

3. The dentist must realize the limitations of roentgenograms and be able to properly use all of the dental diagnostic aids in order to reach the decision that is best for the patient.

A Satisfactory Explanation of Anesthesia Needed • C. D. Leake in discussing the theories of anesthesia, found that after one hundred years of practical success in the control of pain in surgical procedures, we still do not know what anesthesia is. He stated prophetically that "it may be possible indeed not only to afford pain relief through anesthesia, but even to develop such principles as effectively may prevent pain. While these principles may be chiefly concerned with human relationships, they need not be beyond the scope of medical endeavor, since the prime purpose of medical men is to alleviate and to prevent pain." This statement was published in 1942 with the expressed hope that at the bicentennial celebration of surgical anesthesia a hundred years hence, a more satisfactory explanation of surgical anesthesia in relation to the emotional life of the patient would be found. *Bernard B. Raginsky, "Some Psychosomatic Aspects of General Anesthesia," Anesthesiology 11:397, July 1950.*

Pulp protection in restorative dentistry

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The irritating properties of dental cements upon the pulp have been demonstrated independently by Manley[1] in England, Shroff[2] in New Zealand, and Zander[3] in the United States. Their histological studies have been corroborated by practicing dentists who have observed clinically the results, pulp irritation and even pulp deaths, which could not be attributed to operative procedures but only to the materials used, silicate cements in particular.

In order to avoid the undesirable results of dental cements, cavity varnishes have come into widespread use. Histological investigations[4] have demonstrated that they are not completely effective in preventing pulpal irritation.

One of the prime factors in good restorative dentistry is the preservation of the health of the dental pulp. Toward this end, two avenues of approach are open: (1) the development of new and nonirritating restorative materials with suitable physical properties; (2) the development of an efficient barrier to protect the pulp from harmful effects of present filling materials. The second avenue of approach was selected. The purpose of this investigation was to devise an efficient cavity liner to protect dental pulps.

PROPERTIES OF A CAVITY LINER

A cavity liner, in order to be adequate, must protect the dental pulp by preventing penetration of any injurious components of a cement or filling material. In addition, the cavity liner itself must be free from irritating properties. It should provide a smooth, continuous, dry film without pits, fissures, bubbles or cracks, such as might be caused by shrinkage during evaporation of a solvent. The chemical composition of the liner should be such that no gaseous end products will be produced by any reaction with the free acid of the cement liquid. To be applied easily, a cavity lining material should be of medium viscosity and should spread readily over the surfaces of a cavity. It should adhere to the surfaces of the cavity, and should dry or set quickly after application. The applied film should be of such a structure that the excess may be removed from the margins of the cavity without disturbing

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1. Manley, E. B., Investigations into the early effects of various filling materials on the human pulp. D. Record 62:1 (Jan.) 1942.

2. Shroff, F. R., Effects of filling materials on the dental pulp: an histological experimental study with special reference to synthetic porcelain. New Zealand D. J. 42:99 (July), 145 (Oct.) 1946.

3. Zander, H. A., The reaction of dental pulps to silicate cements. J.A.D.A. 33:1233 (Oct.) 1946; Correction, J.A.D.A. 33:1612 (Dec.) 1946.

4. Zander, H. A., and Peiko, I., Protection of the pulp under silicate cements with cavity varnishes and cement linings. J.A.D.A. 34:811 (June) 1947.

the lining in the rest of the cavity. On standing in a bottle, solid particles in the fluid base must not settle out excessively, and it must be possible to redisperse the particles by gentle shaking.

To facilitate comparison of the properties of substances and mixtures to be tested as cavity liners, a rating scale (Table 1) was devised, listing the desirable qualities by reference to which the materials could be rated on an arbitrary scale. The rating scale was such that "1" indicated the most desirable quality. Other less desirable gradations of the property in question were assigned higher numbers; that is, from 2 to 5 as necessary. Therefore, any liner that would rate 1 from each step of the scale would constitute the ideal material. For three of the properties in the scale—continuity of film, gas formation with the cement liquid, and penetration of irritating agents—only a rating of 1 would be acceptable.

Sixty materials and combinations of these materials were rated according to the scale in Table 1. None of the experimental liners tested showed a rating of 1 for all of the properties. However, six liners showed good scores and were selected for further evaluation. They were: aluminum isopropylate in polystyrene in benzene, aluminum hydroxide in polystyrene in benzene, aluminum hydroxide in polyvinyl-vinylidine chloride in acetone and methylethyl ketone, calcium hydroxide in polystyrene in benzene, aluminum hydroxide and zinc oxide in polystyrene in benzene and ethyl ether, and calcium hydroxide and zinc oxide in polyethylene glycol (Carbowax). The methods used have been described previously.[3,4] In these tests, gingival third cavities were cut in dogs' teeth. Each liner was applied to the cavities in the teeth on one side of jaws; the cavities in the teeth on the other side were not lined and served as a control. All teeth on both sides were filled with the same mix of silicate cement. After two months,

Table 1 • Rating scale for liners

Property	Rating
Settling	
None	1
Slight	2
Medium	3
Complete	4
Shaking necessary	
None	1
Normal	2
Much	3
Excessive	4
Application	
Easy	1
Medium	2
Difficult	3
Very difficult	4
Viscosity	
Medium (can pick up)	1
Thin	2
Thick	3
Pasty	4
Very thin, runs	5
Evaporation rate	
Rapid	1
Medium	2
Slow	3
Very slow	4
Gas on drying	
None	1
Present	2
Continuity of film	
Continuous	1
Cracks	2
Pits	3
Alligator	4
Character of film	
Brittle	1
Slightly brittle	2
Very brittle, powdery	3
Slightly tough	4
Tough, rubbery	5
Adhesive to glass	
Good	1
Slight	2
None	3
Adhesive to paper	
Good	1
Slight	2
None	3
Gas released on application of cement liquid	
None	1
Fine bubbles	2
Large bubbles	3
Wetting action of cement liquid on liner film	
Not wet	1
Wets	2
Wets easily	3
Penetration of cement liquid	
Greater than 48 hours	1
Overnight	2
Less than 30 minutes	3
Less than 5 minutes	4
Immediate	5

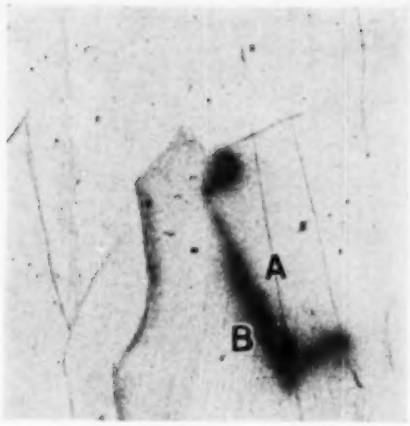

Fig. 1 • Radioautograph of a dog's tooth filled with radioactive silicate cement for 24 hours. A, cavity in which the silicate cement had been removed prior to sectioning. B, penetration of radioactive phosphorus into the dentin

the teeth were prepared for histological study. By this test, none of these liners gave complete and satisfactory pulp protection although they rated high in the scale of Table 1. Although they may have been effective linings, they were probably irritating per se.

One of the liners, calcium hydroxide and polystyrene in benzene, showed much less irritation than the others. In order to test further the material in this liner, and to include new materials, a rapid method was developed.[5] A radioactive silicate liquid was prepared by replacing part of the phosphoric acid with that made from radioactive phosphorus (P^{32}). Silicate powder was mixed with this radioactive liquid and placed in an unlined cavity. Penetration of the radioactive phosphorus into the dentin and pulp occurred and could be demonstrated by means of a radioautograph (Fig. 1). If a cavity liner provided a satisfactory barrier to penetration, no evidence of radioactivity should be observed in the dentin or pulp. Three groups of materials were tested in this fashion: Group A, films only, was comprised of polystyrene, vinyl-vinylidine chloride (Saran—F-120), and cellulose nitrate. Group B, active compounds only, was comprised of aluminum isoprepylate, aluminum hydroxide, zinc oxide, and calcium hydroxide. Group C, active compounds in films, was comprised of aluminum hydroxide in polystyrene, calcium hydroxide in polystyrene, and calcium hydroxide in polyethylene glycol (Carbowax). All the films of Group A were penetrated by the radioactive phosphorus. Of the active compounds listed in Group B, calcium hydroxide and a combination of calcium hydroxide and zinc oxide were not penetrated by the radioactive phosphorus. Of the combinations of active compounds and films in Group C, the calcium hydroxide films were not penetrated. It was then assumed that an effective liner should contain calcium hydroxide, zinc oxide and polystyrene. Twelve combinations of these materials, varying in proportions and vehicles, were then compounded for further histological tests by the method described above. The best of these, consisting of calcium hydroxide 5.0, zinc oxide 5.0, pigments 0.1, polystyrene 2.0, and chloroform 87.9, was then selected for clinical and histological studies in human teeth.

HISTOLOGICAL STUDIES IN HUMAN TEETH

This most effective liner was tested on 63 human teeth from 16 patients ranging from 10 to 49 years of age (Tables 2 and 3). Gingival third or occlusal cavities of varying depths were cut into these teeth. Control and experimental cavity preparations were of the same depth in most instances; one to receive a liner and both to receive silicate

5. Glass, R. L., and Zander, H. A., The penetration of labeled phosphate from silicate in dentin. To be published.

Table 2 • Summary of results with liner and silicates

	Patient Number	Number of teeth studied	Shallow cavities				Deep cavities			
			Lined	Inflam. reaction	Unlined	Inflam. reaction	Lined	Inflam. reaction	Unlined	Inflam. reaction
Filled 1 week	1	2	—	—	—	—	1	No	1	Yes
	2	4	2	No	2	No	—	—	—	—
	3	4	—	—	—	—	2	No	2	Yes
Filled 2 weeks	4	2	—	—	—	—	1	No	1	Yes
	5	5	1	No	—	—	2	No	2	Yes
Filled 3 weeks	6	6	—	—	—	—	4	No	2	Yes
Filled 4 weeks	7	4	1	No	—	—	2	No	1	Yes
	8	2	—	—	—	—	1	No	1	Yes
	9	2	1	No	1	No	—	—	—	—
	10	2	—	—	—	—	1	No	1	Yes
	11	1	—	—	—	—	1	No	—	—
Filled 7 weeks	12	9	—	—	1	Yes	7	No	1	Yes
Filled 8 weeks	13	2	—	—	—	—	2	No	—	—
Filled 10 weeks	14	2	—	—	—	—	2	No	—	—
Filled 12 weeks	15	2	1	No	—	—	—	—	1	Yes
Filled 16 weeks	16	2	—	—	—	—	1	No	1	Yes
	Total	51	6	—	4	—	27		14	

cement from the same mix. The teeth were extracted at intervals ranging from one week to four months after treatment. Twelve teeth were filled with zinc oxide and eugenol cement after the experimental liner had been placed in order to test any irritating qualities of the liner itself (Table 3). Results are further summarized in Table 4.

Patient 1, Age 15 • Two teeth were filled with silicate cement for one week. The cavities were deep; approximately one-sixth of the dentin remained between the silicate and the pulp. The unlined tooth showed the disappearance of the odontoblasts opposite the cavity. There was a large infiltration by round cells, predominantly lymphocytes and leukocytes. There was some disintegration of the pulp tissue opposite the dentin tubules leading to the silicate filled cavity. The tooth that was lined and filled with silicate cement showed some vacuolization in the odontoblastic layer and in the subodontoblastic layer. The remainder of the pulp was found to be normal and there were no signs of inflammation.

Patient 2, Age 12 • All four teeth had shallow cavities and were filled with silicate cement for one week. Two cavities were lined. These teeth showed normal pulps, although three of them had some form of vacuolization in the odontoblastic layer as described for patient 1.

Table 3 • Summary of results with liner and zinc oxide eugenol

	Patient Number	Number of teeth studied	Shallow		Deep cavity	
			Lined	Inflam. reaction	Lined	Inflam. reaction
Filled 2 weeks	5	2	—	—	2	No
Filled 4 weeks	7	3	—	—	3	No
	11	1	—	—	1	No
Filled 8 weeks	13	2	1	No	1	No
Filled 10 weeks	14	2	—	—	2	No
Filled 12 weeks	15	1	1	No	—	—
Filled 16 weeks	16	1	—	—	1	No
	Total	12	2	—	10	—

Patient 3, Age 10 • Four teeth were filled with silicate cement for one week. The cavities extended through about two-thirds of the dentin. The two unlined teeth showed hyperemia and a slight inflammation, as evidenced by the presence of lymphocytes opposite the dentin tubules leading from the pulp to the cavity. The two lined cavities showed a normal pulp. However, there were several breaks in the odontoblastic layer adjacent to the tubules leading to the cavity.

Patient 4, Age 11 • Two teeth were filled with silicate cement for two weeks. Cavities were very deep and only a narrow layer of dentin was left between the silicate cement and the pulp. The lined cavity presented a normal pulp with slight vacuolization of the odontoblastic layer, while the unlined cavity showed the same type of vacuolization, plus slight hyperemia of the pulp tissue.

Patient 5, Age 37 • Six teeth had deep cavities, approximately two-thirds through the dentin, and one tooth had a cavity extending through one-half of the dentin. In two teeth, cavities were not lined but were filled with silicate cement for two weeks. These showed a break in the continuity of the odontoblasts and an accumulation of inflammatory cells opposite the cavity. These cells consisted of lymphocytes with a few poly-

Table 4 • Summary of results with silicates with and without liner, and zinc oxide eugenol with liner

	Teeth Studied	Inflammation		No inflammation	
		Shallow	Deep	Shallow	Deep
Lined and silicates	33	—	—	6	27
Unlined and silicates	18	1	14	3	—
Lined and zinc oxide eugenol	12	—	—	2	10
Total	63	1	14	11	37

Fig. 2 • Lower left lateral of patient 5. A, cavity; B, dentin; C, chronic inflammation; D, normal pulp. This was a sound tooth filled with silicate cement for two weeks before extraction

morphonuclear leukocytes. The histological picture was that of a localized abscess (Figs. 2 and 3). Three teeth that were lined and filled with silicate cement for the same length of time showed a normal pulp (Figs. 4 and 5). Two teeth were lined and filled with zinc oxide and eugenol cement. They also showed normal pulp but a slight vacuolization in the odontoblastic layer.

Patient 6, Age 29 • Six cavities extended through four-fifths of the dentin. Four of the cavities were lined and two were unlined. All cavities were filled with silicate cement for three weeks. The pulps opposite the two unlined cavities showed chronic inflammation with lymphocytes, monocytes, plasma cells and some leukocytes. Of the four lined teeth, all presented normal pulp with a slight vacuolization of the odontoblastic layer.

Patient 7, Age 36 • There were seven cavities, two of which were deep. One tooth with a deep cavity was filled with silicate cement for four weeks. There were hemorrhages and new capillaries in the odontoblastic and subodontoblastic layers, with plasma cells and monocytes. Two deep cavities and one shallow cavity that were lined and filled with silicate cement for four weeks showed a normal pulp and no inflammation, but breaks in the odontoblastic layer with vacuolization. Three cavities filled with zinc oxide and eugenol liner also showed a similar state with a few vacuoles and edema in the odontoblastic layer.

Patient 8, Age 11 • Two deep cavities extended through most of the dentin so

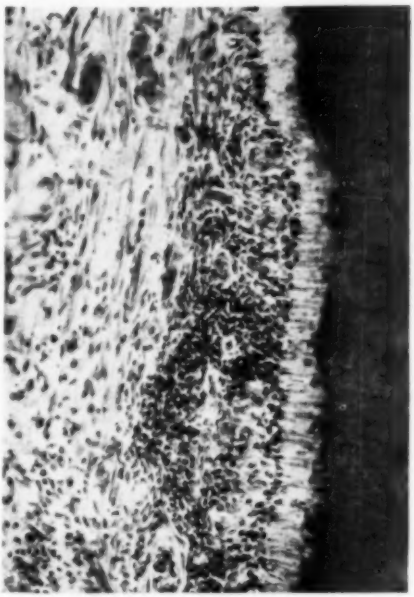

Fig. 3 • Higher magnification of region of chronic inflammation in Figure 2

that only a thin layer of dentin remained between the pulp and the silicate cement. The tooth that was lined presented a normal pulp with no break in the odontoblastic layer. The other showed signs of chronic inflammation opposite the dentinal tubules leading from the pulp to the cavity filled with silicate cement.

Patient 9, Age 12 • Both cavities were shallow, extending through one-third of the dentin; one was lined and both were filled with silicate cement for one month. At the end of this time both showed normal pulps with no break in the odontoblastic layer.

Patient 10, Age 11 • Two cavities were cut through two-thirds of the dentin. Both were filled with silicate cement for four weeks. The unlined cavity had a slight area of chronic inflammation. The lined cavity presented a normal pulp.

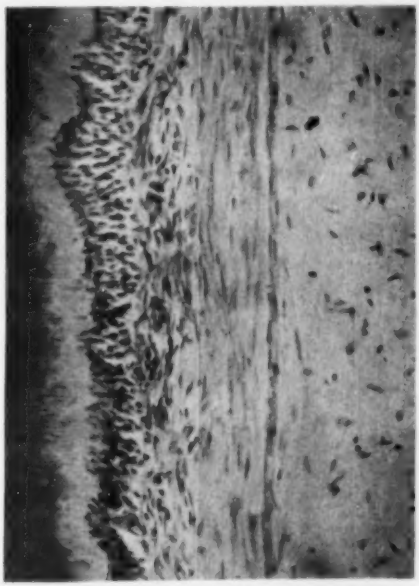

Fig. 5 • High magnification of area of pulp immediately adjacent to dentin tubules leading to cavity shows continuous row of odontoblasts and normal pulp

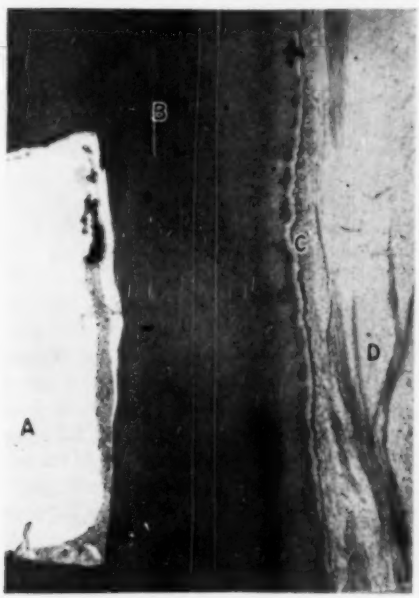

Fig. 4 • Lower right lateral of patient in Figures 2 and 3. A, cavity; B, dentin; C, odontoblasts; D, normal pulp. Cavity lined and filled with silicate cement for two weeks

Patient 11, Age 36 • In two teeth, cavities involved two-thirds of the dentin. The same liner was applied to each; one was filled with silicate cement and the other with zinc oxide and eugenol and liner for one month. At the end of this time both pulps were normal but showed vacuolization and edema in the odontoblastic layer (Figs. 6 and 7).

Patient 12, Age 32 • Eight of nine teeth had cavities through four-fifths of the dentin and one had a cavity through one-half of the dentin. Two of the cavities, one deep and one shallow, were filled with silicate cement without a liner for seven weeks. At the end of this time in

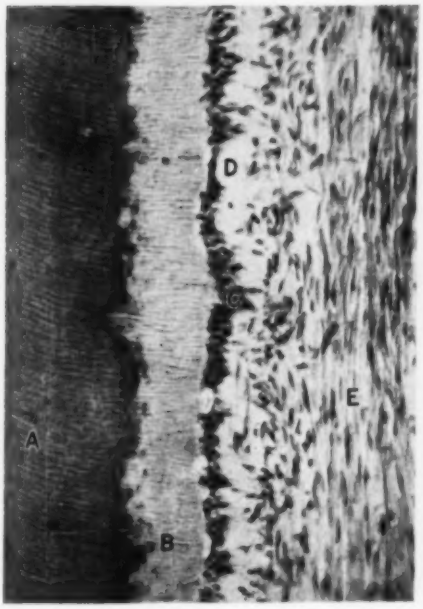

Fig. 6 • Upper right central of patient 11: High magnification of odontoblastic region opposite the dentin tubules leading to the cavity lined and filled with silicate cement for four weeks before extraction. A, dentin; B, predentin; C, odontoblasts; D, vacuoles; E, normal pulp.

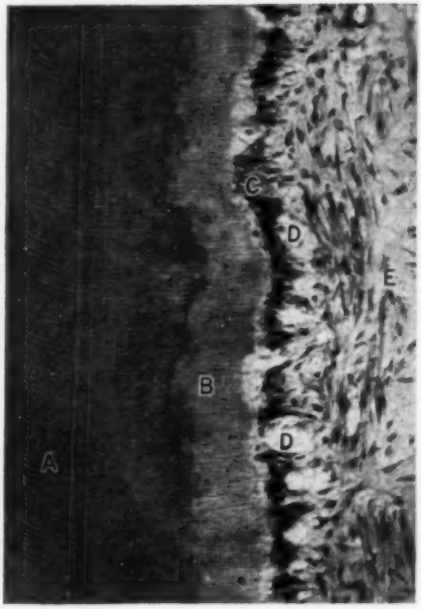

Fig. 7 • Upper left central of patient in Figure 6. High magnification of odontoblastic region opposite the dentin tubules leading to the cavity lined and filled with zinc oxide and eugenol for four weeks before extraction. A, dentin; B, predentin; C, odontoblasts; D, vacuoles; E, normal pulp

tooth cavities irregular dentin formation was beginning. There was a large area of chronic inflammation with lymphocytes and leukocytes predominating (Figs. 8 and 9). Seven teeth, which had deep cavities, were lined and filled with silicate cement. These showed normal pulps; two had vacuoles in the odontoblastic layer. One had no break in the odontoblastic layer (Fig. 10).

Patient 13, Age 49 • Three teeth had cavities through four-fifths of the dentin and one tooth had a cavity through two-thirds of the dentin. All the teeth were lined; two were filled with silicate cement and two with zinc oxide and eugenol. All showed normal pulp tissue, but three showed the kind of vacuolization described before.

Patient 14, Age 33 • Four teeth, with cavities through four-fifths of the dentin, were all lined. Two of them were filled with silicate cement and two with zinc oxide and eugenol cement and liner for two and one-half months. At the end of this time they all showed normal pulps except for vacuolization of the odontoblastic layer.

Patient 15, Age 28 • Two cavities extended through one-half of the dentin and one through three-fourths of the dentin. The deep cavity was unlined and filled with silicate cement; it showed an

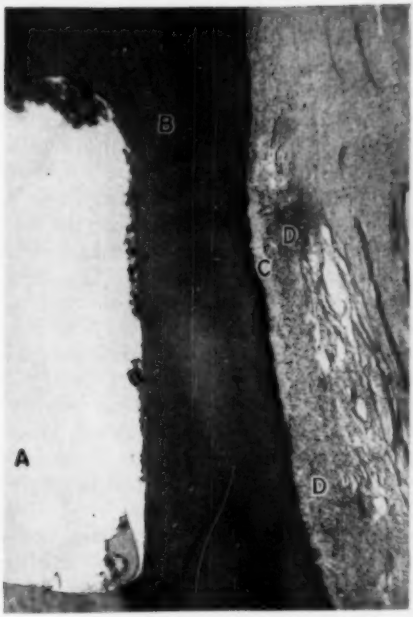

Fig. 8 • Upper right cuspid of patient 12. A, cavity; B, dentin; C, irregular dentin; D, chronic inflammation. This was a sound tooth filled with silicate cement for seven weeks before extraction

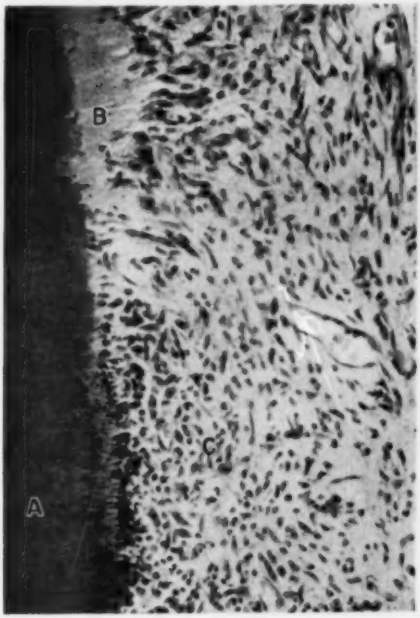

Fig. 9 • High magnification of area of irregular dentin formation and chronic inflammation of Figure 8. A, dentin; B, irregular dentin; C, chronic inflammation

area of inflammation opposite the cavity. The other two cavities were both lined; one was filled with zinc oxide and eugenol and liner and one with silicate cement. Both had normal pulps.

Patient 16, Age 30 • All three cavities were cut through four-fifths of the dentin and two were filled with silicate cement for four months. The first was filled with silicate cement without a liner. This tooth showed signs of irregular dentin formation opposite the cavity and a large accumulation of inflammatory cells. Lymphocytes, monocytes, and plasma cells predominated with a few polymorphonuclear leukocytes present. The lined tooth, filled with silicate cement, showed a normal pulp with the exception of vacuolization in the odontoblastic layer. The lined tooth, filled with zinc oxide and eugenol, also showed vacuolization as well as a slight area of hemorrhage near the odontoblastic layer.

DISCUSSION

In eighteen teeth cavities were filled with silicate cement without a liner. Eleven of these showed varying degrees of chronic inflammation; some of them could be called a localized abscess. Four showed a slight inflammation; three had normal pulps. These observations are in agreement with former studies which demonstrated that silicate, in contact with previously sound dentinal tubules, can be injurious to the pulp. The degree of

Fig. 10 • Lower right cuspid of patient in Figures 8 and 9. A, cavity; B, dentin; C, normal pulp. This was a sound tooth lined and filled with silicate cement for seven weeks before extraction.

injury is dependent upon the depth of the cavity preparation and individual variations. Thirty-three teeth were lined with the material to be tested. Thirty-one showed normal pulp tissue opposite the cavity, except for some form of vacuolization in 19 teeth. Two teeth showed some signs of pulpal irritation which could not be considered inflammation. It is possible that the lining or film was imperfect in the latter two teeth. The fact that vacuolization occurred in so many of the teeth under the liner, whether the cavity was filled with zinc oxide and eugenol or silicate cement, leads us to believe that the chloroform, the solvent in this liner, was responsible for this phenomenon. This is more desirable than the injury resulting from the silicate in unlined cavities. This vacuolization occurred in eight of the twelve teeth that were lined and then filled with zinc oxide and eugenol cement.

The tests with this liner have indicated that it will protect the pulp from the irritating properties of silicate cements. Previous work and the studies using radioactive isotopes suggest that the free acid in cements is one of the factors in the production of irritation. The liner described provides pulp protection by means of a chemical barrier. The calcium compound probably reacts with the free phosphoric acid present in the mixed cement. A further possibility is that the product of the reaction calcium phosphate is so finely divided as to provide mechanical plugs in the network of the polystyrene film. The virtual insolubility of calcium phosphate under these conditions retards, if not prevents, further penetration of the free phosphoric acid of the cement into the liner film. Previous cavity liners are solely dependent on the formation of a semipermeable membrane which only retards the penetration of irritating agents.

In this new liner, a new principle has been utilized. To the film vehicle have been added materials which react with free acids to form relatively inert compounds which help produce an impervious barrier.

CLINICAL APPLICATION

This liner may be applied by a cotton pellet to the cavity floor, over which it readily flows owing to the low surface tension of the chloroform vehicle. The liner dries rapidly because of the high vapor pressure of the solvent, forming a continuous and relatively uniform film. This is important in order to protect equally all exposed dentinal tubules. Homogenization after compounding is responsible for the uniformity of the film. The film dries to a dull ivory within 30 seconds. Thin or blank areas in the film

should be corrected with a second application. Enamel margins are cleaned with a mounted stone or sharp instrument. The color is an aid in determining its presence. Any excess is readily removed without disturbing that part meant to remain for protection of the pulp. The cavity preparation is now ready to receive silicate or zinc phosphate cement.

SUMMARY

A number of experimental cavity liners were prepared and their properties evaluated according to an empirical rating scale. From this rating, promising liners were selected and further tested by histological methods and for permeability to phosphoric acid through the use of radioactive phosphorus as a tracer. A liner consisting of calcium hydroxide and zinc oxide suspended in a chloroform solution of polystyrene was found to be effective. Controlled histological and clinical tests have shown that this liner will protect the pulp, under these conditions, from the irritating properties of silicate, zinc silicate and zinc phosphate cements.

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Psychologic Factors and Dental Caries • From clinical observations Mellars, Miller and others have suggested that numerous pathologic oral conditions may be due to psychosomatic factors. To test this theory Manhold and his associates of the Department of Oral Pathology, Tufts College, Boston, made a comparison of the relationship between neurotic tendencies and dental caries in 49 students, faculty members and employees of his college. Each person was tested according to Bernreuter's personality inventory technic and assigned scores varying from 0 to 100 on his neurotic scale. There were also recorded the DMF (decayed, missing, filled) dental scores. Among the 49 subjects, 28 were below the lowest level of neurotic tendencies, scoring 60 per cent or less on the Bernreuter scale. Of these, 24, or 85 per cent had gained less than a 40 DMF score. Of the 21 subjects with neurotic tendencies (or Bernreuter percentages above 60) 16, or 76 per cent, had DMF scores above 40. High neurotic tendencies were thus correlated with high DMF scores and subneurotic tendencies with low DMF scores. A similar correlation was noted with Bernreuter's introversion-extroversion scores, 78 per cent of those with high scores showing DMF scores above 40 while 84 per cent of those with low scores showed DMF scores below 40. There appears to be a significant correlation between psychologic factors and dental caries, but the subject merits further investigation with different types and a larger number of subjects. *Current Comment, J.A.M.A. 142:422 Feb. 11, 1950.*

Report on the study of dental public health services in New Zealand III

Allen O. Gruebbel, D.D.S., M.P.H., Chicago

So many conflicting reports have been published about the New Zealand dental nurse plan that the Board of Trustees of the Association sent Allen O. Gruebbel to New Zealand last spring to study the program. The following article is an excerpt from the Gruebbel report. Other excerpts were published in the September and October issues of THE JOURNAL. The complete report in printed form and an appendix in mimeographed form are available on request.

SCHOOL DENTAL SERVICE: ADMINISTRATION AND PROCEDURE

Dental treatment of children in the school and adolescent scheme is not compulsory. However, the health officials, the headmaster of the school and the teachers use their influence to have every child enrolled in the School Dental Service. Children are requested to report to the clinic as a routine procedure. Upon enrollment of the child in school, parents are requested to sign a "consent form." Dental treatment is not provided until authorization by the parent has been obtained.

When the School Dental Service was first put into operation, a large percentage of the parents refused to accept the service for their children. At the present time approximately 85 per cent of the school children are receiving dental care, which in general terms is confined mostly to fillings, cleanings and extractions. Although no accurate records are available, Health Department officials estimate that less than 2 per cent of children under 13 years of age receive dental treatment from private dentists and that less than 1 per cent refuse treatment in areas where dental care is available.

Dental clinics, financed by the Health Department, are placed only in or near public school buildings. At the present time there are 508 school dental clinics in operation. Thirty-two new ones were established in 1949. Private schools are required to build and equip their own clinics if dental care is provided on the premises, in which case the Health Department supplies the dental nurse.

Secretary, Council on Dental Health, American Dental Association.

OBJECTIVES

The aim of the School Dental Service is to provide dental care for all preschool and school children until they reach the age of 13 years, through the provision of those services for which dental nurses are trained.

The functions of the School Dental Service, according to the official statement of the New Zealand Health Department, are:

> To improve the standard of dental health of school children and of pre-school children from 2½ years of age, by affording them regular and systematic treatment at six-monthly intervals over a period of years. Treatment is commenced on entering the primer class (and earlier wherever possible), and is continued to Standard VI or Primary Schools and the equivalent grade (Form II) in the case of Intermediate Schools.
>
> To instruct the school children and also the general public in the principles of oral hygiene and the preservation of the teeth.

ELIGIBILITY FOR DENTAL CARE

All preschool children and all children in primary schools (age 2½ to 13) are eligible for dental care at the expense of the state under the School Dental Service. There is no means test. The only requirement is the consent of the parents, which must be in writing.

All adolescents from 13 to 16 years of age are eligible for dental care under the Social Security dental benefits scheme. There is no means test. Treatment is provided by salaried dentists employed by the state or, in areas where none is available, by private dentists. Dental care for adolescents includes all types of dental treatment with the exception of orthodontic treatment.

SERVICES PROVIDED

Each school dental nurse is assigned 500 children for whom she theoretically is to provide dental care at six month intervals. In areas in which less than 500 children live, pupils are transported to a sub-base by school buses.

The school dental nurse provides the following services: (1) Copper amalgam fillings in primary teeth. (2) Copper amalgam prophylactic fillings in permanent teeth (prophylactic odontomy). (3) Silver amalgam in permanent posterior teeth and in some cases in permanent lower anterior teeth. (4) Cement bases under fillings using oxyphosphate of zinc and copper cement. (5) Kryptex or Restorit fillings for anterior permanent teeth. These filling materials are a combination of chemical porcelain oxyphosphates. Synthetic porcelain fillings in anterior permanent teeth were not provided by school dental nurses until 1942. (6) Zinc oxide and eugenol for pulp capping when pulps are exposed. (7) Extraction of primary and permanent teeth using infiltration anesthesia. (8) Cleaning of teeth. (9) Dental health education.

The method of giving topical fluoride treatments is taught to the students now in training, but the procedure has not thus far been incorporated into the School Dental Service. Although the value of this preventive method is recognized, it is not presently being employed for three reasons:

1. School dental nurses in the field have not been taught the procedure.
2. Saliva ejectors and compressed air for drying teeth are not available to the school dental nurses.
3. The topical fluoride treatments would take more time from operative services than administrators of the program are willing to allot.

Operative procedures are highly standardized. There is almost no deviation in preparation of cavities or in the placement of fillings. Rubber dam is used only when filling permanent anterior teeth with silicate cement. Wedges are not used to support the matrix.

The school dental nurse does not make a thorough oral diagnosis; she does not provide periodontal treatment; she does

not study growth and development; she does not diagnose nutritional deficiencies; she does not perform routine canal therapy or orthodontic treatment.

In a few instances, preventive orthodontics is attempted; as for example, the correction of a lingually locked upper anterior tooth. Orthodontic treatment is not provided routinely in the School Dental Service. Plans are being made to treat a limited number of children with malocclusion in the clinics for adolescents. The small amount of orthodontic care New Zealand children now receive is obtained from private practitioners at the expense of the parent.

The school dental nurse also is required to carry out dental health education activities. This part of her work includes oral hygiene instruction in the dental clinic and education programs for teachers, parents and children in the school to which she is assigned.

The central office of the Health Department supplies the school dental nurse with posters, literature, slide films, motion pictures and other education aids.

REFERRAL OF PATIENT TO A DENTIST

When, in the opinion of a school dental nurse, a child requires treatment of a kind beyond her scope, she notifies the principal dental officer and submits the patient's chart with a recommendation for the type of treatment needed. On receipt of the proper forms, the principal dental officer approves the recommendation if the needed treatment falls within the scope of special dental benefits. The child is referred to a staff dental officer or, if none is available in the area, to a private practitioner.

This practice is more often an exception than a rule. In most cases children are referred to a fully trained dentist only in case of serious emergency. When the pulp of a permanent tooth is exposed, the pulp is capped. If an abscess develops, the tooth is extracted. A fractured tooth is another type of emergency. In handling such a case, the school dental nurse informs the dental officer in the district. He, in turn, notifies the parent and authorizes treatment by a private practitioner if an employed clinic dentist is not available. The dentist is paid a fee stipulated under Socal Security dental benefits.

The provision of special dental benefits is governed by the regulations established by the Department of Health. For example, the regulations provide that:[46]

> While silicate cement is the filling materials to be used in all permanent anterior teeth, silver amalgam may be used in cases where—
>
> (i) It is not possible to maintain a dry operative field by use of rubber dam, as in the case of certain lower anteriors.
>
> (ii) Where appearance is not a factor, as in distal surfaces of upper canines.
>
> . . . Where an officer considers that owing to unusual circumstances it would be better for a patient to have a number of teeth removed at the one time under nitrous oxide, the parent should be given the option of having this done by a private practitioner *at her own cost*. If not agreeing to this, the work is to be effected in the clinic. . . .
>
> . . . *Orthodontic treatment, including the extraction of teeth to relieve overcrowding, is not covered by "special" dental benefits.*
>
> In every case where malocclusion is apparent in a patient, the attention of the parent or guardian should be immediately drawn to the condition . . . and advised to seek further advice and treatment. If the parents desire the opinion of an officer of the Department, a note of the case is to be made and the Principal Dental Officer of the district (or the Senior Dental Officer of a sub-district as his deputy) consulted when next visiting the clinic. If after personally examining the case and inquiring into the circumstances of the parents the Principal Dental Officer is satisfied that it is beyond their means to place the case in the hands of a private practitioner, he may, at his discretion and with the concurrence of the parents, direct the removal of certain teeth to relieve the malocclusion. On no occasion are teeth to be extracted at the direction of a private practitioner unless he has specified in writing the teeth to be ex-

46. Official instructions: dental benefits. New Zealand School Dental Service Gazette 10:2 (Jan.) 1950.

tracted and the prior approval of the Principal Dental Officer or Senior Dental Officer is obtained.

If the dentist takes x-rays or extracts teeth to relieve overcrowding, this is to be effected at the parents' expense.

EQUIPMENT FOR CLINIC

The basic dental clinic, to which one nurse is assigned, is designated a B type clinic. Some schools have an A type clinic, to which two dental nurses are assigned.

The floor plan and arrangement of the dental chair, water basin, sterilizer, filing cabinets and instrument bracket table are the same in all clinics. School dental clinics have a waiting room, a treatment room and a nurses' dressing room. The equipment consists of a portable wooden chair, a foot engine, an instrument case, an operating light, a sterilizer (electric, hot water), a hot water heater, and an electric heater for the room.

The Department of Health has secured a number of new dental units which are being installed in some of the school dental clinics. The units include an electric engine on a balanced arm, a saliva ejector, cuspidor and water faucet. These new units will replace the foot engines and enamel pans for saliva waste that have been standard equipment since the School Dental Service was established.

The dental nurse obtains supplies for her clinic by sending a requisition to the principal dental officer every three months. The principal dental officer submits the request to the central office of the Health Department.

When the School Dental Service first came into being, the local community paid from one half to two thirds of the cost of the clinic building and equipment. Since 1945 the government has assumed the full cost.

SUPERVISION OF SERVICES

The work of the school dental nurse is under the immediate supervision of the principal dental officer in the district. He delegates certain responsibilities to the dental nurse inspector, but it is his duty to visit the dental clinics and to provide general supervision over the operative dental services given by the nurses. The principal dental officer pays a visit to the school dental clinic on the average of once every six weeks. The dental nurse inspector visits the dental nurse about once every three weeks.

The inspection by the principal dental officer includes the following: (1) Cleanliness and general appearance of the clinic. (2) Accuracy of the records, with particular emphasis on case load and the six month revisions (recall patients at six month intervals). (3) Inspection of operative dentistry, which is accomplished by calling 10 or 12 children from their classes and by giving them a dental inspection by use of a mouth mirror and explorer. (4) Consultation with the headmaster of the school to check on the general behavior and action of the school dental nurses.

SCHOOL DENTAL CLINIC COMMITTEE

A School Dental Clinic Committee composed of interested and influential community leaders is appointed in every area in which a dental clinic is located. Members usually include a local dentist, headmaster of the school, representative of a private school if one exists in the area, and members of the Parent-Teacher Association.

The School Dental Clinic Committee does not have administrative authority, but it is given the responsibility of supplying electricity, water, heat and cleaning and laundry service and procuring lodging for the school dental nurse.

The Health Department allots £50 ($140) to the School Dental Clinic Committee for the above services. This fund is replenished with an allotment of a similar amount when bills are presented showing that the money is exhausted.

SCHOOL DENTAL NURSE

Position • The school dental nurse's place in the school was described in the November 1949 issue of the *School Dental Service Gazette,* published bimonthly by the Department of Health, as follows:[47]

> Every School Dental Nurse is well aware that in certain respects she is regarded as being a member of the staff of the school at which her clinic is located. Not only is she at all times an officer of the Department of Health but necessarily she must, on account of the special nature of her position, be subject to the same rules of conduct which are imposed by the Head Teacher on members of the teaching staff. . . .
>
> Her allegiance is, as it were, divided. To the Principal Dental Officer of the district she owes efficient management of her clinic, which embraces loyalty, devotion to duty, and harmonious relations with patients, parents, Committee members, and others she may meet in the course of her dental duties. In this sense the clinic is regarded as a field unit in the Department of Health organization.
>
> However, the clinic may also, from the local point of view, be regarded as a unit of the school itself, just the same as class-rooms and staff rooms are so regarded. It is in this connection that the School Dental Nurse owes equal loyalty and devotion to duty to the Headmaster. . . . To assist him, School Dental Nurses should be punctual in their hours of work, whether the school classes are in operation or not. They should be courteous and friendly with parents and teachers, and, above all, enter into the life of the school whenever possible. . . . Consideration in the making of appointments so that there is the least possible disruption of classes will always be appreciated. . . .
>
> Consideration can also be given to the time when a particular type of operation is to be performed—*e.g.,* an extraction carried out at the end of the school day will often obviate distress to the child and inconvenience to the teacher.

Hours • School dental nurses are required to be on duty from 8:40 A.M. to 4:45 P.M. on days when school is in session. One hour is taken for lunch.

Clothing • School dental nurses purchase their own shoes locally and then apply to the Health Department for a refund of the amount expended. Shoes to be worn on duty must have the low or Cuban style heel with a straight inner sole. Cardigans are supplied free of charge but remain the property of the Department of Health. Six pairs of white stockings are provided each year.

Salaries • The salaries of the New Zealand School Dental Service follow:

School dental nurses	Per annum	
First year (after completion of training)	£288	$ 806.40
Second year	325	910.00
Third year	355	994.00
Fourth year	380	1,064.00
Fifth and subsequent years	405	1,134.00
Dental nurse inspectors and dental tutor sisters		
First year	£470	$1,316.00
Second and subsequent years	495	1,386.00

There are efficiency bars in the above scale at £325 and £380 per annum, beyond which point salaries do not extend unless the school dental nurse has been specially recommended for a salary increase.

Allowances • Additional allowances are the following:

1. An allowance at the rate of £15 ($42) per annum is payable to school dental nurses who are appointed to take charge of clinics in which there is a staff of more than one school dental nurse.
2. An allowance at the rate of £5 ($14) per annum is payable to student dental nurses who are selected for appointment as section leaders at the Dominion Training School.
3. A remote allowance of £15 ($42) per annum is payable to school dental nurses who are appointed to clinics approved for such an allowance by the Public Service Commission.
4. An allowance of £15 ($42) per annum is payable to school dental nurses

47. The school dental nurses' place in the school. New Zealand School Dental Service Gazette 9:37 (Nov.) 1949.

who are appointed to take charge of clinics which are regarded as difficult centers.

Note: Only two of the above allowances may be paid to any one school dental nurse.

5. Traveling allowances are also paid according to the Public Service scale to officers whose duties require them to travel or to reside temporarily away from their headquarters.

Board and Lodging • School dental nurses live in rooming houses or with private families. They pay, on the average, £1 5s. ($3.50) a week for a double room or £2 ($5.60) for a single room. These prices include meals.

Tax Deductions • From the salaries of all persons employed by the government, 5 per cent is withheld for superannuation (retirement) contributions and 12½ per cent for National Security and Social Security.

Personal Liability • Dental nurses are subject to malpractice suits. The government does not assume liability, although it has made settlements in a number of malpractice cases in which the dental nurse accidentally injured a child. Dental nurses do not carry liability insurance.

The officials of the New Zealand Health Department make the claim that only a very few serious accidents involving a school dental nurse have occurred in a school dental clinic. In each case the Health Department settled claims for damages out of court.

Continuing Education • There is no organized program of continuing education for school dental nurses. The principal dental officers in the various districts occasionally hold meetings with the dental nurses to discuss special problems, to present new ideas for conducting health education activities and, in some instances, to show a new motion picture on operative technics.

New Zealand State Dental Nurses Institute • School dental nurses maintain an informal organization of their own known as the New Zealand State Dental Nurses Institute. The purpose of the organization is to engage in social activities and to discuss personal problems. The organization has local branches which hold meetings periodically. Two meetings of the national group are held annually.

There has been no large scale effort to organize school dental nurses as a trade union, chiefly because they are officers of the government.

Personnel Shortage • The School Dental Service is organized on the basis of employing one dental nurse for every 500 children. During the 1948-49 school year there were approximately 320,000 preschool and school children between the ages of 3 and 13. A total of 640 school dental nurses are needed to meet the ratio of 1:500. On March 31, 1949, there were 492 nurses in service. Thus, there was a shortage of 148 during the last school year. Table 25 shows the number of dental nurses who have graduated since 1923 and the number in service during each of the 26 years of operation of the School Dental Service. The aim of the Health Department for the immediate future is to employ a staff of 700 school dental nurses.

Prior to the last war many more young women applied for training than could be accepted. The Health Department now receives only about 100 applications annually and is encountering considerable difficulty in maintaining its quota of dental nurses. In order to meet the greatly increased need resulting from the increased birth rate and the relatively high number of resignations, 300 newly trained school dental nurses are needed each year.

The following statement dealing with the shortage of personnel appeared in

Table 25 • School dental nurses graduating and in service, 1923-1949

Year	Nurses graduating	Nurses in service March 31
1923	28	28
1924	13	28
1925	—	32
1926	19	41
1927	24	42
1928	26	62
1929	27	75
1930	32	94
1931	36	128
1932	35	172
1933	19	182
1934	—	168
1935	22	165
1936	24	156
1937	29	164
1938	47	188
1939	60	210
1940	73	242
1941	61	284
1942	59	319
1943	66	388
1944	56	442
1945	65	425
1946	70	438
1947	82	441
1948	90	469
1949	99	492

the 1948-49 annual report of the Division of Dental Hygiene:[48]

The work of the Division has been seriously hampered during the year under review by an acute and increasing shortage of staff at all levels. The Division is seriously understaffed not only in the field clinics, but also in the administrative and teaching departments as well. Although numerically the field staff is a little larger than it was last year, it is not expanding in the same proportion as the child population. Consequently it has become increasingly difficult to maintain the principle of systematic and regular attention which has always been a fundamental fixture of the Service. . . .

In the administrative sphere it is proving impossible to attract dentists with the necessary qualifications and experience, and the effects of shortage at this level must necessarily be felt throughout the whole Service. It is difficult to escape the conclusion that the remuneration offered is inadequate to bring into the Service men and women of the caliber required. . . .

Although the actual number of Dental Nurses in the field is about the same (451, as against 440 twelve months before), this number is now quite inadequate to cope with the needs of the rapidly growing school population. At the date of this report the shortage of Dental Nurses is estimated at 150, and by 1952, when the number of children entering the schools is expected to reach its peak, an increase of at least 300 Dental Nurses will be required.

The director of the Division of Dental Hygiene stated recently as follows:[49]

The School Dental Service has entered upon a critical phase in its history. To-day factors beyond our control are operating to deprive us of the ascendancy that we had gained in our long and successful struggle to control dental disease in the school population. Our staff is insufficient to cope with our commitments—and this in spite of our having doubled the annual intake of Student Dental Nurses in the last few years. The reason is well known to all of you—it is that the unprecedented increase in the school population is out-stripping the expansion of our field staff. Then, you say, why not train still more Dental Nurses? The answer is that we are willing and anxious to do so—if we can get them. But here we face another difficulty. The age-group from which Student Dental Nurses are drawn is a low birth-rate group from the "depression" period of the early "nineteen-thirties," and the plain fact is that there are many more positions waiting to be filled from this group than there are individuals to fill them. Thus, in our endeavour to maintain a high standard of dental health in the child population, we are hampered by two irreconcilable factors, and at a time when we need more Dental Nurses than ever before to cope with the rapidly increasing school rolls, our source of recruits is at bed-rock. Nevertheless, we *must* get more recruits.

Attrition Rate • According to information supplied by the Division of Dental Hygiene, the average length of service of the school dental nurse is 7 years and 9 months. This applies only to those who have resigned.

48. Annual report, 1948-49, Division of Dental Hygiene. New Zealand School Dental Service Gazette 9:43 (Nov.) 1949.

49. Saunders, J. L., We must have more nurses. New Zealand School Dental Service Gazette 9:4 (Jan.) 1949.

Table 26 • School dental nurses and student dental nurses: number, resignations, transfers and reappointments, 1944-49

	1944-45	1945-46	1946-47	1947-48	1948-49	Average for five years
Dental nurses in service	425	438	441	469	492	453
Resignations	34	71	64	72	73	63
Transfers	7	36	127	121	191	96
Reappointments			57	22	37	39
Student dental nurses in training	149	183	206	202	202	188

Of the dental nurses who resign their positions, marriage accounts for approximately 95 per cent of such resignations. Prior to the last war, only unmarried women were employed. During and since the last war, dental nurses who married could continue to serve. This change in policy was made because of the personnel shortage. It will be noted from Table 26 that resignations have doubled since the 1944-45 period. This increase in the number of resignations is due, it is believed, to the increased postwar marriage rate.

A number of dental nurses resign their positions for higher salaries in other fields. The Health Department is not able to bring its staff of dental nurses to full capacity because higher salaries are paid to teachers, physiotherapists, typists and factory workers.

Only one dental nurse resigned her position in order to study dentistry. Because of poor grades, she did not complete the course. No efforts are made to interest others in studying dentistry.

Transfer • The transfer of personnel from one station to another has become a major problem in the School Dental Service. The annual number of transfers increased from 7 in 1947 to 191 in 1948-49. During the latter period, 38 per cent of the school dental nurses were transferred.

In some instances school dental nurses are transferred because they do not maintain the required amount of treatment or because they are not suited to work in the area to which they are assigned.

Most school dental nurses prefer to be assigned to urban areas. The first two or three years after graduation from training school they are given assignments in rural areas. As soon as regulations permit them to do so, they apply for a transfer either to be stationed in an urban area or to be near relatives. Because of the increasing rate of resignations, a lenient policy has been adopted in recent years. Requests for transfers are approved as soon as practicable, which accounts for the high percentage of transfers.

QUANTITY OF DENTAL CARE

There are approximately 320,000 children in New Zealand between the ages of 3 to 13 years. All children in this age group are eligible for dental care provided by the school dental nurse. Less than 1 per cent are treated by private practitioners.

During the last year for which data are available, 235,746 children (73 per cent) were listed as having been treated by the school dental nurse (Table 27). Each child, on the average, received 4.4 reparative fillings, 0.4 prophylactic fillings (4.8 fillings of both types) and 0.29 extractions during the one year period.

Although there has been a steady in-

Table 27 • Amount of dental care provided in School Dental Service, 1944-49

	1944-45	1945-46	1946-47	1947-48	1948-49	Average for five years
Treatment centers	413	447	456	476	508	460
Children under treatment	168,588	210,920	226,798	233,981	235,746	215,207
Schools included in plan	2,203	2,348	2,313	2,331	2,333	2,306
Reparative fillings	779,534	871,450	906,553	931,925	1,045,191	906,931
Prophylactic fillings	201,232	194,667	173,447	177,587	94,538	168,294
Extractions	81,524	68,656	68,663	66,750	69,718	71,062

crease in the number of reparative fillings, there has also been a marked decrease in the number of prophylactic fillings. Two reasons are given for this change:

1. Increasing emphasis is being placed on giving priority to teeth that are decayed.

2. A number of the principal dental officers do not believe that prophylactic odontotomy is a worthwhile procedure and, therefore, do not encourage school dental nurses to insert prophylactic fillings.

The numbers of fillings and extractions of primary teeth and of permanent teeth are not listed separately in the annual reports of the Division of Dental Hygiene. It is impossible to make a statistical analysis, therefore, of the amount of treatment given to the primary and permanent teeth.

In response to an inquiry regarding the number of extractions of primary and permanent teeth, the director of the Division of Dental Hygiene supplied the following information: March 1948 to February 1949: permanent, 2,571; primary, 73,834. March 1949 to February 1950: permanent, 3,322; primary, 89,192. The extractions for March 1948—February 1949 do not correspond with the figure given in Table 27 because of a difference in the months covered during these years.

The annual reports of the Division of Dental Hygiene also do not provide statistical data on the number of oral prophylaxes and gum treatments performed by the school dental nurse. These items are included under the general heading "other operations" in the reports filed with the Health Department by the school dental nurse.

COST OF DENTAL SERVICES

It is impossible to determine from the data available in the New Zealand Health Department how much the government is spending annually to maintain the dental nurse plan, the School Dental Service and the adolescent scheme.

SCHOOL DENTAL SERVICE

Some rough estimates were available indicating that the School Dental Service, including the training of dental nurses, cost £322,000 ($901,600) during the 1948-49

Table 28 · Cost of School Dental Service, 1948-49

Items	Pounds	Pounds
Training School and Annex		
Salaries—professional staff, student nurses, etc.	53,000	
Stores, equipment, stationery, fuel, light, etc.	2,000	
Cleaning and caretaking	2,280	
Telephones	150	
Interest on capital	3,500	
Depreciation	1,800	
Rental (annex)	560	
Sub-total		63,290
Residential Hostels		
Provisions, repairs, heating, salaries, wages, etc.	15,439	
Interest on capital	1,666	
Depreciation	1,685	
	18,790	
Less recoveries of board and lodgings from nurses	9,067	
Sub-total		9,723
Field School Dental Clinics		
Salaries of dental officers and nurses	180,000	
Stores, equipment and miscellaneous	63,000	
Traveling expenses	2,487	
Sub-total		245,487
Administration		
Salaries of clerical officers (Dental Division and Training School)		3,500
Total		322,000*

* Based on the current exchange rate of $2.80 to the pound, this sum equals $901,600.

fiscal year (Table 28) and that £226,372 ($633,841.60) were spent for Social Security dental benefits during the same period (Table 29). On the basis of these figures, it was estimated that the cost for each school child receiving treatment was £1 7s.3d. ($3.81). The cost of general dental benefits was computed at £3 2s.11d. ($8.79) per child and special dental benefits at £2 9s.10d. ($6.96) per child.

In actual fact, these figures represent only part of the cost of the dental services. Various expenditures were not included in the financial statement. Two of the largest items not reported were salaries for clerical staff and the cost of constructing and maintaining 508 treatment centers. The latter item alone would amount to an initial construction cost of at least £508,000 ($1,422,400). Interest, depreciation and maintenance on this capital investment would amount to a considerable sum of money.

The reasons for the lack of more complete cost accounting are not clear. The explanation given was that the method of accounting does not provide a ready and accurate answer to the cost of the dental service.

Although one can only guess how much the government is paying for each person being treated, it is quite certain that the amount is much higher than the estimates on the School Dental Service (Table 28), Social Security dental bene-

fits (Table 29) and the adolescent scheme, as reported in New Zealand[48] and in this country.[50] During the last fiscal period the school and adolescent dental services cost considerably more than a half million pounds (about one and a half million dollars).

DENTAL CLINICS

The present cost for constructing new school dental clinics is from £1,000 ($2,800) for the B type clinic to £1,500 ($4,200) for the A type clinic and £250 ($700) for instruments and equipment.

QUALITY OF DENTAL TREATMENT

A careful search of dental literature did not disclose a scientifically tested method for determining the quality of dental treatment in public health programs. In the absence of a suitable measuring device, an evaluation of the quality of dental treatment as provided by the school dental nurse was made on the basis of empirical judgment.

Owing to the fact that fillings represent about 90 per cent of the total service rendered by the school dental nurse, the adequacy of fillings was used as an index of the quality of dental treatment.

When this study was organized originally, authorities in the field of pedodontics suggested that the adequacy of fillings might be determined by noting the following conditions: tooth alignment maintained, comfortable mastication maintained, carving of marginal ridges and occlusal fossa, smooth margins, fractured filling, fracture of tooth around filling, and thermal shock.

It was not possible, for practical purposes, to include all of these items in the clinical examination of children. Therefore, the original suggestions were revised in order to shorten the examination time. The final evaluation procedure was based on four points, which it was thought would serve as satisfactory criteria for classifying fillings as to quality.

The items chosen were: poor restoration of tooth form, faulty margins, fractured filling, and fracture of tooth around filling.

Table 30 shows that 27.9 per cent of 3,220 fillings examined were defective for one or more reasons. In 10.2 per cent, there was poor restoration of tooth form. In 11.0 per cent, the fillings had faulty margins. In 4.7 per cent, the fillings were fractured, and 2.0 per cent were judged defective because the tooth around the filling was fractured.

In examining the children who were enrolled in the school dental clinics, it was noted that an unusually large number of teeth had two, three, four and five separate fillings. Tabulations were made of the number of fillings in 5,909 primary teeth and in 3,059 permanent teeth in children 7 to 14 years of age. Table 31 shows that 51.4 per cent of filled primary

Table 29 • Social Security dental benefits: number of patients and cost

Number of persons enrolled, March 31, 1949			
General dental benefits			67,945
Special dental benefits			9,015
Total			76,960
Amounts paid for year ending March 31, 1949			
General dental benefits			£203,128
Special dental benefits			23,244
Total			£226,372
Number of completed cases			
General dental benefits			64,566
Special dental benefits			9,345
Total			73,911
Average cost per completed case	£	s.	d.
General dental benefits	3	2	11
Special dental benefits	2	9	10

50. Marshall-Day, C. D., New Zealand school dental service in operation. J. Den. Children 16:4 (fourth quarter) 1949.

Table 30 • Number and per cent of defective fillings in a total of 3,220 fillings, according to specified conditions, in permanent teeth of children 10-14 years of age, living in five different areas in New Zealand, as shown by clinical examination using mouth mirror and explorer

	Number	Per cent
Number of fillings	3,220	
Poor restoration of tooth form	328	10.2
Faulty margins	354	11.0
Fractured filling	151	4.7
Fracture of tooth around filling	64	2.0
Fillings with one or more defects	897	27.9

Table 31 • Number and per cent of teeth with one to five separate fillings in children age 7-14 years

Primary teeth

	Number	Per cent
Teeth with 1 filling	2,872	48.6
Teeth with 2 fillings	1,796	30.4
Teeth with 3 fillings	869	14.7
Teeth with 4 fillings	313	5.3
Teeth with 5 fillings	59	1.0
Teeth with 1 or more fillings	5,909	100.0

Permanent teeth

	Number	Per cent
Teeth with 1 filling	1,410	46.1
Teeth with 2 fillings	1,178	38.5
Teeth with 3 fillings	312	10.2
Teeth with 4 fillings	104	3.4
Teeth with 5 fillings	55	1.8
Teeth with 1 or more fillings	3,059	100.0

teeth and 53.9 per cent of filled permanent teeth had more than one filling. More than 6 per cent of filled primary teeth and more than 5 per cent of filled permanent teeth had been filled four or five times. Although the above percentage is small, it becomes more significant when it is realized that the patients were under 15 years of age.

Sixty-one bitewing roentgenograms were made of children taken at random from 121 children, age 10 to 14 years, to supplement the clinical examination in the evaluation of the quality of dental treatment. The roentgenograms were sent to Kenneth A. Easlick, professor of dentistry at the University of Michigan, for study. Dr. Easlick's evaluation and conclusions are shown in Table 32.

As a result of his study of the bitewing roentgenograms, Dr. Easlick commented as follows:

> Grading the operative dentistry exhibited in these films strictly on the basis of the technics currently taught to students, the quality is poor. Dismissing the few primary teeth available for study, I am impressed by (1) the failure to carry out occlusal fissures to the proper extent and depth, (2) the failure to carry the proximal boxes of compound cavities far enough gingivally, (3) faulty matrix technic and proximal contouring and (4) the wide extension of the proximal boxes in a pulpal direction without an adequate cement base to preserve proper cavity form in this area. I have no way to tell how the operative work exhibited in these films will compare with operative work in this country when practiced by people with special training in the management of children.

SOCIAL SECURITY DENTAL BENEFITS FOR ADOLESCENTS

Dental examinations of military personnel during World War II revealed that the dental health status of recruits was not a great deal better than it had been during World War I. Although there were not as many school dental clinics in operation when individuals who served in World War I were of primary school age, nevertheless the health authorities were surprised to learn that the School Dental Service had not raised the level of dental health to a greater extent than was noted. It was concluded that the gains that had been made through periodic dental care in school clinics were lost when children graduated from primary school and no longer were eligible for treatment in the School Dental Service. This conclusion led to the Adolescent Service.

Table 32 • Evaluation of adequacy of fillings as shown by a study of bitewing roentgenograms of 61 New Zealand children

Data on permanent teeth	
1. Films	61
2. Discarded	2
3. Studied	59
4. Total number teeth examined (included sufficiently in film for a satisfactory study)	401
5. Missing teeth	5
6. Impacted bicuspids	4
7. Malposed bicuspids	1
8. Unfilled incipient proximal cavities detected	94
9. Unfilled deep (close to pulp chamber) proximal cavities (4 appeared to be teeth with exposed pulps; 11 deep occlusal cavities also were noted)	17
10. Filled exhibiting recurrent caries	20
11. Occlusal surface fillings (only 1 filling counted for each tooth, but the occlusal filling was counted separately if proximal surface had been filled by a spot filling not carried over the proximal marginal ridge)	94
12. Proximal surface fillings (only 1 filling counted per tooth except in instances of proximal spot fillings)	141
13. Total number fillings counted	235
Evaluation of fillings in permanent teeth	
Proximal Surface Fillings	
1. Proximal spot fillings (no evaluation)	25
2. Occlusal portion of cavity (2 or 3 surface fillings)	
a. Depth	
(1) Adequate	53
(2) Insufficient	31
(3) Too deep	32
b. Cement base	
(1) Required and adequate	22
(2) Required but inadequate or none	38
c. Extension of occlusal fissures mesiodistally	
(1) Adequate	82
(2) Inadequate	34
3. Proximal box portion of cavity	
a. Extension of floor to immune area gingivally	
(1) Adequate	49
(2) Inadequate	67
b. Axioproximal thickness of filling	
(1) Adequate	33
(2) Inadequate	4
(3) Too wide	79
4. Restoration	
a. Gingival margin	
(1) Smooth	58
(2) Overhang	58
b. Contour and contact	
(1) Adequate	53
(2) Inadequate	63
c. Surface	
(1) Smooth	73
(2) Ragged	43
d. Gingival adaptation	
(1) Adequate	97
(2) Short, remaining or recurrent caries	19
Occlusal Surface Fillings	
1. Depth	
a. Adequate	49
b. Inadequate	45
2. Mesiodistal extension	
a. Adequate	26
b. Inadequate	68

Primary teeth	
1. Total number surveyed	17
2. Unfilled incipient proximal cavities detected	4
3. Unfilled deep proximal cavities	4
4. Fillings exhibiting recurrent caries	8
5. Occlusal surface fillings	2
6. Proximal surface fillings	13
7. Total number fillings counted	15
8. Evaluation: Of the 15 primary teeth filled, only 2 exhibited adequate fillings. All of the teeth involved were close to their exfoliation period, however.	

ADOLESCENT SERVICE

In 1945, the Minister of Health announced the inauguration of the Adolescent Service which would constitute "the second phase of a national dental service."[51]

The aim of the dental care scheme for adolescents is to provide dental treatment at six month intervals to all youth from the time they leave the School Dental Service at age 13 until they reach the age of 19. For the present, eligibility ceases at age 16. There is no means test. It is also the aim of the government to render all dental care for adolescents in state clinics, but because of a shortage of dental officers and clinic facilities most of the dental service for adolescents is provided by private practitioners on a fee-for-service basis.

The Health Department justified this extension of the dental health program as follows:[52]

> Until now the free treatment of school children by the school dental nurse ceased on the child leaving the primary or intermediate school, and it was left for the child to avail himself of dental treatment thereafter from a dental surgeon at his own expense and if he felt inclined. That so many of our ex-patients did not regularly visit their dental surgeon for conservative treatment is very evident from the number of young people we see on our streets today wearing artificial dentures. . . . The adolescent scheme is being carried on initially by private practitioners on a fee-for-service basis, and as trained dental surgeons become available from the University of Otago Dental School these qualified practitioners will take over the adolescent clinics on a full-time salaried basis.

The development of the scheme and the negotiations between the government and the New Zealand Dental Association were described in a recent issue of the *New Zealand Dental Journal*:[53]

> When the present Government, in 1935, indicated its policy to increase the availability of medical and dental services to the community, the N.Z. Dental Association at that time put forward a modified scheme whereby a subsidy would be paid by the Government for conservative dentistry, particularly for adolescents. However, nothing further was done in active discussion for some time after that.
>
> By 1942, however, it became apparent to the Central Executive that there would be a demand—not only in New Zealand but in many other countries—for some form of increased governmental contribution to the cost of health services; and that, with this, would come some type of control of the dental profession itself. Your Executive, along with other professional bodies, was greatly concerned that this control should be at a minimum consistent with the increased services to the community.

Following a consultation with the branch societies, the Executive Council of the New Zealand Dental Association adopted the following recommendations:[53]

> Subject to the details of an extension being satisfactory to a committee to be set up by the New Zealand Dental Association, and subject also to increasing attention being given to the pre-school child, we recommend to the Government that the present State Dental Service

51. New Zealand School Dental Service Gazette 5:4 (Feb.) 1945.

52. New Zealand School Dental Service Gazette 7:5 (March) 1947.

53. Adolescent dental service. New Zealand D. J. 45:201 (July) 1949.

Table 33 • Methods of discharging obligations by dental bursar graduates

Method of discharging obligation	Bursar
Under contract with health department	
Adolescent service	17
Mental hospitals	3
Remained with health department after expiration of contract	
Adolescent service	3
Under contract with the University of Otago Dental School	4
Under contract in hospital boards	7
Remained with hospital boards after expiration of contract	2
Under contract in the armed forces (Army-Air)	6
Remained with armed forces after expiration of contract	3
Completed contracts and entered private practice	6
(One of these left the armed forces and took a position at the Otago Dental School)	
Broke dental bursary agreements and repaid monies	18
Total	69

be extended so that all adolescents up to 18 years (whether at school or in industry) be given complete dental treatment by graduate dentists. . . .

In February, 1944, this basic decision was communicated to the then Minister of Health, the Hon. A. H. Nordmeyer, who agreed that the officers of the Division of Dental Hygiene should discuss details with a special committee of the Association. In July of the same year, before this special committee had been able to meet, the Government informed the Association that it had definitely decided to set up a corps of salaried dental surgeons for the purpose of doing dentistry ultimately for all adolescents. It was realised that this would take a long period to build up, and in the meantime the Government intended to utilise the services of selected school dental nurses, working under the direction of dental surgeons. . . . It was also proposed to invite the members of the profession themselves to undertake voluntarily and at an agreed rate of remuneration—either on a fee-for-service, or a capitation basis—the dental care of suitable groups of adolescents. . . .

In February, 1946, the first full discussion of all these arrangements was held by the Executive Council, and approval was given to every stage of the negotiations, on the general understanding that the age limits would not be extended to fifteen until the age group of fourteen years had been made dentally fit.

It should be noted that the complete present Scheme is not one endorsed whole-heartedly by the profession. In the first place, before the Association had finalised its discussions, the Government made it plain that it was bringing in the Scheme of its own volition, but (as a temporary measure only) was adopting fee-for-service remuneration for private practitioners; and secondly, the Association has at no time agreed with the Government's policy to extend the age to the sixteenth birthday without ensuring the dental fitness of younger children. This latter action was a responsibility taken by the Government against the Association's advice, and has already led to considerable difficulties, which may take some years to overcome.

While the present temporary fee-for-service Scheme came into force early in 1947, it should be clearly understood that the regulations under which it is administered allow for a parallel growth of a salaried service in addition. Under present circumstances this salary service has proved difficult to build up. . . . However, some slight progress has been made, though the Government has not been fully successful in attracting personnel, either for professional or administrative duties.

At the Annual Conference held in Wellington in 1948, the Executive Council confirmed the general policy of the Association's attitude towards a temporary fee-for-service, but an ultimate salaried service, for adolescents in New Zealand. . . .

Members and Branches will be asked whether they re-affirm the principles set out by the Association since 1942, or whether present trends and experience with the fee-for-service Scheme indicate some modification of these principles.

CLASSES OF DENTAL BENEFITS

Dental care under the Social Security Act is provided without regard to the financial status of the family. These dental benefits are in addition to those provided in the School Dental Service. There are two classes of benefits:

1. General dental benefits include all types of dental services, with the exception of orthodontic treatment. General dental benefits are provided mainly to adolescents, age 13 to 18, inclusive.

2. Special dental benefits include (a) those services which are not given in school dental clinics and which are referred to private practitioners, and (b) special types of treatment for adolescents

and adults that are approved by the principal dental officer and agreed to by the contracting dentist.

A complete account of the regulations and procedures governing the administration of Social Security dental benefits will be found in the Appendix, pages 104-155. A list of the fees to which contracting dentists are entitled will be found on page 113 in the Appendix. All other types of services not listed in the schedule may be provided only after approval has been obtained from the principal dental officer. Fees for these "nonscheduled" services are listed on page 150 of the Appendix.

TRANSFER OF PATIENTS

The official instructions of the Health Department to the school dental nurses provide that children who have been under regular treatment at a school dental clinic become eligible for further treatment as a dental benefit when passing out of the highest class under treatment at the clinic. When children are no longer eligible for service in the school dental clinic, the dental nurse notifies the principal dental officer in the district who sends a notification to the parent that treatment at the clinic has expired and that the child is eligible for enrollment in the Social Security dental benefit scheme.

SHORTAGE OF PERSONNEL

There were approximately 108,000 adolescents between the ages of 13 and 16 years in New Zealand in 1949. A total of 67,945 (63 per cent) were enrolled in the Social Security dental benefit scheme as of March 31, 1949.

The government would need a staff of about 216 dental officers to serve all adolescents, age 13 to 16, in state clinics. About 378 dental officers would be needed to serve all adolescents, age 13 to 19. A staff of this size would be 52 per cent of the total number of registered dentists in 1949. There are at present 17 dental officers who operate in clinics.

Of the 672 private practitioners holding annual practicing certificates on March 31, 1949, 488 had contracted to provide treatment under the Social Security dental scheme. This number does not include dentists who are employed in private dental offices and, therefore, the figure 488 does not represent the total number of dentists engaged in providing dental benefits under Social Security.

The training and employment of a sufficiently large number of staff dental officers is a problem which the Health Department officials find exceedingly difficult to solve. It is the aim of the government to provide as much of the dental care for adolescents in state clinics as possible and to build up a staff of dental officers by granting bursaries to dental students. The dental students who are granted bursaries are required to work for the state for three years following graduation. The agreement can be dissolved by repaying the money allotted by the government.

Table 33 lists the methods by which obligations were discharged by 69 bursars concerning whom information is available. Eighteen repaid the bursary allotment to enter private practice; 6 completed their contracts and also entered private practice. The remainder are in some form of government service.

It is generally admitted that the required number of dental officers cannot be employed until salaries can be brought up to the amount presently being earned in private practice.

MANAGEMENT OF AN UNUSUAL CASE

By Robert E. Davison, D.D.S., Summerville, Ga.

A 35-year old woman came to my office with her eight year old son. The problem was hers but it involved the child in that he was becoming ashamed of her.

As pictured (Fig. 1), the woman's lower facial dimension was opened one-half inch, the maxillary incisors extremely protruded and spaced, the upper lip shortened and unable to cover even the gingiva. Owing to continued exposure to air, the gingiva was inflamed and hypertrophic. The lower teeth were in good condition.

A first impulse was to make an immediate partial denture replacing the maxillary anterior teeth. General roentgenograms were made and further facial measurements and models obtained. These increased the problem thus: It was now apparent that when even all of the maxillary teeth were extracted and a radical alveolectomy performed, closing the mandibular incisors into the upper ridge would still leave the lower facial dimension one-eighth inch greater than the upper half.

The patient told of other dental examinations in which the only solution suggested was the extraction of all teeth, with a 6 to 12 month lapse before any attempt to construct dentures. This was contraindicated by the fact that the lower teeth were excellent and the fact that she did not wish to appear in public without dentures. She had a two-week vacation due and consented to go without her upper anterior teeth during this time.

A tentative plan was forming and three appointments were made for upper extractions. Appointments one and two took care of the upper bicuspids through molars, with complete alveolectomy and suturing. Healing was fast and without mishap or loss of work. On the first day of vacation, the six anterior teeth were extracted. It may be noted here that the upper lip would not cover the untrimmed ridge even without teeth present. Two sutures were placed in the labial frenum and the frenum was severed between the sutures. The alveolectomy was extreme to the extent that the anterior palatine papilla was on the crest of the ridge.

Fig. 1

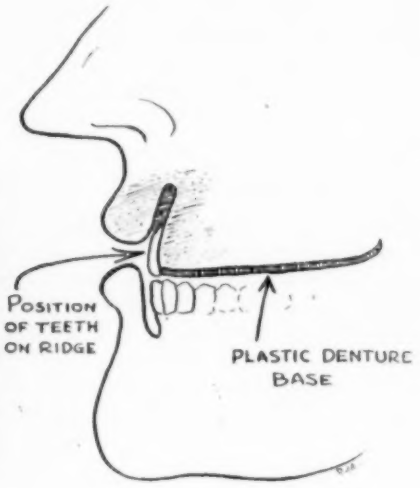

Fig. 2

Fig. 3

Four days of healing were allowed before impressions were made and models articulated. The upper and lower lips could now meet for the first time, and the facial dimensions were correct when closed entirely. There was one small catch: where to put the teeth?

The answer was reached while toying with the problem late one night. Acrylic anteriors were selected and thinned down from the lingual to a thickness of one-sixteenth inch. These six teeth were arranged flat on the labial aspect of the ridge with the incisal edges only slightly beyond the crest of the ridge (Fig. 2). Two cuspids were thinned down for each side to represent bicuspids. The palate was waxed in with attachment to the incisal edges only, and with no labial extension of acrylic. If labial acrylic had been employed, the lip would have again been shortened and protruded. The lower molars were closed into the wax and created their own occlusion as did the incisors.

The case was processed in clear acrylic since pink would have shown through the teeth. The old-fashioned suction-cup relief was employed as a temporary measure of retention. The patient was instructed to use adhesive powders until a more permanent type denture could be made.

The patient was happy (Fig. 3), and in a short time had undergone a complete psychological change, from a quiet, secluded person to an outstanding and popular conversationalist. She reports ability to eat with the appliance and to maintain it in place without the aid of denture powder. The ridge shrinkage is almost sufficient after five and a half months to make a normal denture.

OPEN REDUCTION OF FRACTURED MANDIBLE: REPORT OF CASE

By Ralph O. Christensen, D.D.S., Clinical Assistant Professor, Oral Surgery Division, School of Dentistry, University of Minnesota, Minneapolis.

A young housewife was referred to the University of Minnesota Hospital on March 7, 1948, for the treatment of a fractured mandible. The fracture was incurred at 11:00 P.M., March 6, when the patient fell from her bed during sleep, striking her chin upon a hardwood floor. The following day she noted a swelling on the left side of the face and was unable to open and close her mouth. She consulted her physician, who in turn referred the case to the University of Minnesota Hospital.

Clinical examination on the morning of March 8, revealed a well developed girl, 17 years of age, with a moderate degree of swelling over the left angle of the mandible, with crepitus, and very tender upon palpation. There was a moderately severe degree of trismus and a small amount of intraoral swelling in the retromolar triangle area, as well as a 1 cm. medial displacement of the anterior margin of the ramus toward the midline. The oral hygiene was good. A normal complement of 28 teeth, were present in good repair and with no caries.

Anteroposterior roentgenograms of the skull and left and right oblique roentgenograms of the mandible revealed a comminuted fracture compound of the left angle of the mandible, complicated by the presence of an impacted lower third molar directly in the line of fracture and wedged between the distal and proximal fragments (Figs. 1 and 2). There was marked medial and superior displacement of the posterior fragment.

The results of general physical examination were essentially negative except for a history of arrested menses for the past three months. The O.B. consultation revealed a normal primigravida which they felt was not a contraindication to any procedure we felt was indicated in the treatment of this case.

Treatment planning included the consideration of an attempt to leave the third molar in position, digitally manipulate the fragments,

Fig. 1

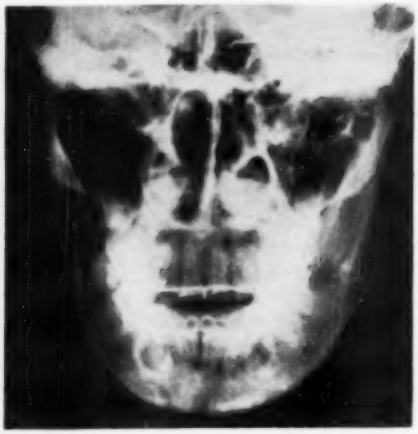

Fig. 3

Fig. 2

Fig. 4

and wire teeth in occlusion, but preference was given to a plan which would eliminate the foreign body from the fracture line. Therefore, on March 8, under local anesthesia, an incision was made through the retromolar triangle area, exposing the crown of the impacted tooth, after which simple elevation removed it intact. Roentgenographic examination the following day still revealed a marked degree of overriding of the fragments. It was impossible to bring the teeth into normal occlusion. Open reduction and direct bone-wiring (Figs. 3 and 4) was then arranged for the following morning.

The dental intern on this date applied a 26 gage brass wire Risdon arch to the upper and lower dental arches.

On March 10, after premedication with morphine sulfate grains 1/6 and hyoscine grains 1/150, the patient was taken to the operating room, and under thiopental sodium and curare, nitrous oxide, and oxygen anesthesia by the endotracheal route, the face was prepared and draped in the usual manner. The area to be operated upon was then infiltrated with 0.5 per cent procaine hydrochloride and 1:50,000 epinephrine for hemostasis. A 3 cm., slightly curved incision was made beneath the inferior border of the left mandible at the angle, and carried through the

Fig. 5

Fig. 6

skin, subcutaneous tissues, the superficial fascia and the platysma. The superficial bleeders were ligated and, by blunt dissection with curved blunt scissors, the mucoperiosteum of the inferior border of the mandible was exposed, incised, and elevated with periosteotomes, revealing the bone fragments. There was considerable comminution, especially on the lingual aspect of the mandible. The attached fragments were not removed and the detached spicules were inserted into the marrow space of the bone and the fragments were approximated. With a no. 560 dental drill, one hole was drilled in the distal fragment and a corresponding hole was drilled in the proximal fragment approximately 4 mm. from the inferior border and 3 mm. from the fracture line. Number 26 gage stainless steel wire was then inserted through the holes and the bone fragments, under direct vision, were approximated and wired in correct anatomic position. The wound was closed in layers with no. 000 chromic suture for subcutaneous tissues. The skin was closed with no. 000 silk, using on-end mattress and interrupted sutures alternately. A pressure dressing was applied over the wound and, after the patient was fully conscious, tie-wires were placed between the superior and inferior Risdon arches. This brought the teeth into good normal occlusion.

Postoperative roentgenographic examination revealed the fragments to be in essentially normal position (Figs. 5 and 6).

The sutures were removed on March 13, and on March 15 the patient was discharged from the hospital. She returned at one-week intervals for a period of six weeks, at which time the tie-wires were removed. Clinical testing for mobility revealed none. No pain or tenderness could be elicited on manipulation. Roentgenographic examination showed no indication of resorption around the wires and the fragments remained in good position. Figure 7 is a photograph of the patient taken two weeks after the operation.

Fig. 7

829 LaSalle Building

RETAINED SECOND DECIDUOUS MOLAR ROOTS

By M. M. Gershater, D.D.S., White Plains, N. Y.

Normal exfoliation of deciduous molars may be interfered with for many reasons and the retained roots of these teeth are frequently observed in routine roentgenographic examination (Fig. 1). This condition may be incorrectly diagnosed as an osteosclerotic area when met with long after the changeover to the permanent dentition has taken place. The deciduous root frequently has become included in the alveolar bone with little or no evidence of a peridental membrane. In a review of numerous roentgenographic series done prior to orthodontic treatment, the incidence of retained deciduous roots is surprisingly frequent. The roots of the lower second deciduous molars are met with more often than those of the other molars, but examples of other affected roots are also not unusual.

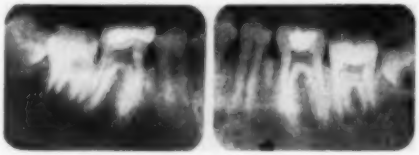

Fig. 1

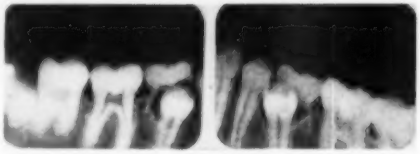

Fig. 2

In the first case shown (Fig. 2), both lower deciduous molars are about to be exfoliated. The resorption of the mesial roots has proceeded more rapidly than that of the distal root, and the tooth maintains its position rapidly in the dental arch by the anchorage of this distal root. The root may be detached from its crown in one of two ways. In an attempt at extraction the tooth may fracture at the cervix, its weakest area. Without a followup roentgenogram this could pass unnoticed by the operator, or after further attenuation of the root there may be complete separation of the two parts and ultimate exfoliation of the crown. In these two cases of prolonged retention of second deciduous molars (left side of Fig. 3 and Fig. 4) the teeth were eventually extracted in order to permit the normal eruption of the unerupted permanent bicuspids. At a later date, during a routine roentgenographic check-up, the retained roots were disclosed (right side Fig. 3 and Fig 4).

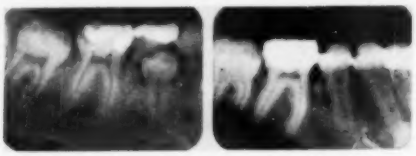

Fig. 3

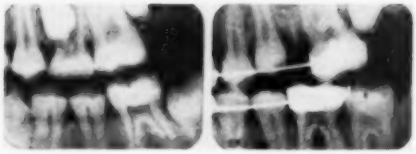

Fig. 4

The presence of retained deciduous roots can also be an etiological factor in the development of malocclusion. The erupting second bicuspid may be deflected due to the presence of the retained deciduous root acting as a foreign body in the path of eruption. The normal cuspal relationship in the area is altered and a malocclusion is established as a result of the malpositions of the first permanent molar and the second bicuspid. This type of malocclusion renders the local periodontal tissue more susceptible to food impaction, with subsequent pocket formation and periodontal disease. The localized gingivitis is accelerated in those cases where the root tip approximates closely the gingival border and interferes with the normal vascular supply of the area.

Usually, the fractured root tip is free of infection, and when detached remains in the bone without any complications. However, if periapical infection exists around the retained root there is a strong possibility of cyst formation.

Routine roentgenographic examination is advised before and after the removal of deciduous molars in order to avoid such complications.

15 Longview Avenue

LON W. MORREY, D.D.S., EDITOR

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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

New army dental bill introduced in Congress

On page 617 of this issue is published the text of the latest Army dental bill sponsored by the Association. It was introduced in the Senate by Senator Lester C. Hunt (D., Wyo.) in mid-September and in the House of Representatives by Representatives Walter E. Brehm (R., Ohio) and L. Mendel Rivers (D., S.C.). Like other bills of a similar nature submitted to Congress during the past five years, this bill is designed to improve the dental health of the armed forces and to provide Army dental officers with authority commensurate with responsibility.

The new bill proposes to change the name of the Army Medical Service to Army Health Service. It designates the chief dental officer of the Army as Chief of the Dental Corps and makes him responsible to the Secretary of the Army, through the Surgeon General, for the dental health of Army personnel. It requires the assignment of a sufficient number of enlisted men trained as dental assistants to enable dental officers to perform their function most efficiently. It fixes the position of the dental officer in the field and makes him responsible for local matters relating to dental health. It establishes the same relation between the soldier patient and the Army dentist that exists between the civilian patient and the civilian dentist.

At this time when the Armed Forces are again seeking a large number of dental officers it would be desirable for the executive officials of the various services to support rather than to oppose this bill. In the past high ranking Army officers have consistently opposed every piece of legislation designed by dentists to improve the functioning of dentists within the army. Time after time, usually after long years of struggle, the Congress has recognized the points advocated by the profession. In no instance have the Armed Forces later asked to have the legislation changed so as to restore the old system.

The aim of this bill is to provide better dentistry for Army patients. The principles on which is it based have been long accepted as valid. Change after change has been made in successive drafts of the proposal in order to accomplish the main purpose within the military framework of the Army. If still further changes are

needed dentistry will welcome constructive suggestions of Army officials. The profession will resent and resist frivolous objections intended to kill the measure. The demand for this bill springs from the experiences of dentists in the Army during World War II. Those dentists, now civilians, will insist that the Congress enact laws which will permit the new crop of dentists entering the Army or returning to duty to fulfil their professional obligations to the patient and with a minimum waste of time, effort and manpower.

The nineteen fifty relief fund campaign opens this month: give now, give generously

Traditionally November and December are Relief Seal months. During the next few weeks members of the Association will receive a small quantity of Relief Fund Seals, symbols of the profession's policy of caring for its needy. Little did the dentists of California[1] realize in 1907, when they turned back to the Association some $3,900, that this small surplus from the San Francisco fire benefit fund would grow by mid-century to over half a million dollars. From this small beginning the present American Dental Association Relief Fund has developed. It is the only institution of its kind among national professional organizations and one that assures freedom from want to worthy members in need and their families.

What the Fund Is • The American Dental Association Relief Fund is a living trust built of contributions from members and others interested in the profession. Its resources are protected legally from attachment and set up separately and entirely apart from the resources of the Association.

How the Relief Fund Works • Contributions are stimulated in November and December of each year when the Council on Relief mails sheets of Relief Fund Seals to members of the Association. The Relief Seals serve as a reminder and as an invitation to participate in the relief program. Dentists respond by contributing sums ranging from $2 to $100 or more which are deposited to the Relief Fund account. Fifty per cent of the contributions collected is returned to the state dental societies from which they originated, fifty per cent is retained by the American Dental Association Relief Fund. Only the interest on the principal sum of the Fund, which now amounts to $667,782.26, can be used for relief purposes.

Who Benefits • Any worthy destitute dentist or his family is eligible for benefits. Two thirds of each benefit is paid by the American Dental Association Relief Fund and one third by the constituent and local societies.

Each year interest among members in the Relief Fund grows greater. In 1947 donations amounted to $47,091.57, in 1948 they were $61,322.89, and last year they reached $83,044.29, the highest in history. In 1948, 7 state societies contributed their quotas; in 1949, 16 states fulfilled their quota requirements.

This year the Council on Relief again has set the national goal at $100,000, a modest sum considering the size of the Association membership.

The hundreds of dentists who have been benefited through the Relief Fund is proof of the worthiness of the project. The few dollars contributed annually by each member will never be missed by the donor but they will assure continuance of the fund and help ease the burden of some less fortunate member. The need is greater this year than ever before because of the increased cost of maintaining minimum necessities of life for those who have been forced to call on the Relief Fund for aid. Each member is urged, on receipt of the Relief Seals, to respond as generously as possible.

1. Transactions of the American Dental Association, 1915, page 384.

Aptitude test now employed as aid in selection of freshman dental students

The American Council on Education, concerned over the impact which present mobilization plans may have on the production of professional and other scientific personnel, recently approved the principle of draft deferment of college students on the basis of educational aptitude. A resolution, passed by that body October 7, asserted that: "Such deferment should employ measures of individual aptitude and capacity, and also take cognizance of the continuing educational performance of the individual."

This resolution is in keeping with policies long advocated by this Association. Ever since the early days of World War II the Association has urged strongly that dental and predental students be deferred so long as their scholastic record was satisfactory. In 1946 the Council on Dental Education of the Association, in cooperation with the American Association of Dental Schools, initiated an experimental aptitude testing program for freshman dental students. So successful was the experiment that this month the program is being adopted by the 41 recognized dental schools in the United States.

Students desiring to enter the 1951 freshman dental class may take the aptitude test in November and December of this year or in February and March of 1951, from eight to ten months prior to the opening of school. It is contemplated that aptitude tests for 1952 students may be given a full year prior to their entering date and that eventually first year predental students may take the test and be certified for admission to dental school provided they maintain a satisfactory scholastic record.

In view of the present military situation the development of the aptitude testing program is extremely fortunate. The unanimous adoption of the program by the

dental schools provides dentistry for the first time with an acceptable method of selecting students best suited to enter the profession. Its use will decrease appreciably the student mortality rate that formerly was considered inevitable and it will help provide a continuous flow of qualified graduates for civilian and military purposes.

Dental schools that have employed the aptitude testing program report that it has reduced the mortality rate of freshman students from more than 12 per cent to less than 4 per cent. On this basis it is conceivable that the schools, by careful selection, may reduce the mortality rate of all dental students during their four years of undergraduate life from an estimated 20 per cent to 5 per cent. This salvage will effect an economic saving and it will assure an increase in both the quality and quantity of graduates.

By reducing student mortality to a minimum, American dental schools, now equipped to handle about 3,225 freshmen, should graduate nearly 3,000 seniors annually or twice the number of dentists lost during the same period through death and retirement. Thus one half of the annual dental graduates will become a sizable factor in meeting the needs of the military services.

It is hoped that government officials will approve the proposal of the American Council on Education. The practical experience gained by this Association indicates that the aptitude test plus recognition of educational performance is a sane solution of a complex problem.

Washington News Letter

Fulfilling expectations, applications for commissions in the Dental Corps of Army, Navy and Air Force increased sharply after the so-called "doctor draft" was proclaimed in October by President Truman, followed by mandatory registration of former ASTP's and V-12's. Actual inductions of dentists and physicians are scheduled to begin in November, although voluntary commissionings are almost certain to reduce to a small figure the number of professional men donning uniform as privates.

However, there is ample precedent for induction of dentists. According to Selective Service, 555 of them came into the Army via this compulsory route in World War II, and the majority of them subsequently applied for and received commissions in the Dental Corps. There were two principal reasons for these inductions: delay in seeking commissions after being placed in "available for duty" category by Procurement and Assignment Service; failure to qualify for appointment for one reason or another.

Proposed administration of the doctor draft law was discussed in detail by Maj. Gen. Lewis B. Hershey, director of the Selective Service System, Richard L. Meiling, medical director of the Department of Defense, and dental chiefs of the three armed services at a meeting of the District of Columbia Dental Society, attended to capacity, on October 10. Daniel F. Lynch, trustee of the Association for the Fourth District, presided over the session which featured a spirited question-answer program.

Salient points emerging from the meeting, together with indications of Washington policy of more recent date, may be summed up as follows:

Deferment will be extremely difficult to gain. Navy and Air Force will not, at least for the time being, send any draft quotas for dentists to Selective Service since their voluntary procurement programs are proceeding satisfactorily. Civilian dental and medical needs will be carefully considered in connection with enlargement of military forces, a point emphasized by Dr. Meiling. Neither Navy nor Air Force expects to call up any of its Dental Reserves other than those who volunteer their services, unless orders for full mobilization are issued.

VA DENTAL SERVICE PROGRAM

Losses of many of its Reserve dentists to the armed forces, combined with decreased appropriations and added responsibilities, are seriously complicating the dental service program of Veterans Administration. It has adopted a firm policy of refraining from seeking draft deferment for any of its full-time dentists. In October, VA began taking on additional duties —imposed a short time previously by Congress—incidental to providing full dental and medical care for 118,000 veterans of the Spanish-American War, Boxer Rebellion and Philippine Insurrection. No additional appropriations were granted for these new functions; to the contrary, there was a $5 million dollar reduction of operating funds levied against VA by the Budget Bureau, a large part of which will be taken out of money set aside for the home town medical and dental care programs.

Figures for the month of August reveal the huge volume of this fee-for-service dental program. In that month, private practitioners received $2,556,590 for dental treatment of VA beneficiaries, in addition to $205,962 for dental examinations. Treatments and examinations totaled 28,321 and 15,198 respectively. During the fiscal year which ended last June 30, fee payments for dental examinations and treatments totaled approximately $32,500,000, more than double the $14,500,000 expended for comparable medical services.

According to Veterans Administration officials, no one eligible for these home and office out-patient services will be forced to go without them as a result of shrinking professional manpower, reduced appropriations and the increased potential of beneficiaries. It is explained that waiting time will be lengthened but eventually all obligations will be met.

Lengthening of the waiting time raises the point whether this will serve to increase government costs by permitting minor dental conditions to become major ones, while the prospective patient is awaiting his turn, thereby raising the cost of treatment when he is ultimately reached on the list. This was one of the problems discussed the latter part of October at a three-day conference in Washington of prosthodontists in charge of VA's central dental laboratories. Participants included

Raymond J. Nagle, of Harvard, and Gilbert P. Smith, of Columbia. The same subject was scheduled to be considered at the October 22 meeting of VA's dental advisory council.

Bion R. East, director of the Administration's dental services, has announced the appointment of Stanley N. Bordner as dental supervisor for the Washington area office. Dr. Bordner formerly was chief of the dental service at Chamblee (Georgia) Veterans Hospital.

NAVY RADIOISOTOPE COURSE

Bureau of Medicine and Surgery, Navy Department, is hopeful of obtaining a ruling which will allow it to conduct a special radioisotope course for Reserve Dental and Medical Corps officers November 27 to December 2. The seminar originally was scheduled for September but had to be canceled for lack of applicants. Rather, the number of applicants was more than ample but virtually all of them withdrew on being informed that, to qualify for the course, they would have to execute an affidavit to the effect they would accept calls to active duty on 30 days' notice if military mobilization were ordered. Bureau of Medicine is attempting to have this requirement waived by Bureau of Naval Personnel so that the course may be conducted in November.

International Correspondence

NEWS FROM GREAT BRITAIN

The events in Korea have had repercussions on men and women in all walks of life in Britain. The effects on the dental profession have not been very severe but they have made and left their mark. Because calling up the reserves to the armed forces included dentists, a number of men have had to leave practices, partners or hospital appointments at very short notice with resultant disorganization for patients and those left to carry on. It will be remembered that in Britain there is compulsory military service for all over the age of eighteen. It is possible to defer this service, which is for a period of eighteen months, until a university course or other period of training is completed. It is usual for medical and dental students to proceed from school to the university and on graduating they are immediately liable for call up unless a further postponement is obtained to enable them to hold junior hospital appointments for six months or a year. The conscripts serve in their professional capacity as physicians or dentists. As a result of the necessity to strengthen National Defense the service period has been extended from 18 months to two years and this affects those already undertaking their compulsory training as well as those who will do it in the future. So those who were expecting release soon had to put back their arrangements to reenter civilian life for another six months and thus there will be no increase in the dental manpower for private practice or school dentistry during the coming winter. During the three or four years immediately after World War II, there was a great scarcity of dental instruments; our national finances did not allow the import of as many instruments from the United States as formerly. Only in the past few months has much of a selection been available, and these are of either British or European manufacture. It is now expected that the increase in the defense program will reduce the quantity and quality of steel available for dental manufactures.

CHANGES IN DENTAL SCHOOL FACULTIES

W. Kelsey Fry has succeeded R. V. Bradlaw as Dean of the Faculty of Dental Surgery of the Royal College of Surgeons of England.

F. C. Wilkinson is leaving the Dental School of the University of Manchester to take up the important appointment of director of the Postgraduate Dental Institute, London.

John Boyes

Armed Forces

500 DENTISTS TO BE INDUCTED INTO ARMY BY MID-JANUARY: DENTISTS WILL ADVISE STATE SELECTIVE SERVICE DIRECTORS

The Army has requested the induction of 300 dentists by December 15 and of 200 more by January 15. The announcement, made by the Defense Department in mid-October, stated that the Navy and Air Force did not then plan to request inductees.

In the induction of dentists and physicians, Selective Service officials will be advised by the health advisory committee to the National Security Resources Board. Headed by Howard A. Rusk of New York, the committee has as its dental member Leo J. Schoeny of New Orleans, chairman of the Association's Council on Dental Health.

Army's needs will be filled from Selective Service lists compiled from the registration October 16 of a group of dentists under 50 years of age. The registration, ordered by the President only ten days earlier and authorized by Public Law 779, included dentists, physicians and veterinarians under 50 who were deferred to complete their education during World War II or who were ASTP or V-12 trainees and had since had less than 21 months' active service. All dentists in these categories were required to register, regardless of whether they were licensed to practice. Those already registered under the Selective Service Act of 1948 were required to re-register. Reservists and national guardsmen were not, however, required to register.

Of dentists who registered October 16, those with less than 90 days' active duty will be drafted before those with 90 days or more but less than 21 months' active service and, in accordance with regulations issued by President Truman October 12, the youngest men in each category will be called first. Induction is to be for a period not longer than 21 months.

All registrants were to be classified 1-A until their local draft boards, acting on information which would justify reclassification, placed them in some other classification. Nine deferment or exemption classifications were defined by executive order. They are: 1-A-O, conscientious objectors; 4-E, extreme conscientious objectors who oppose even noncombatant war service; 1-D, reservists; 2-A, persons essential in their communities to the "maintenance of the national health, safety, or interest"; 3-A, registrants whose induction would result in "extreme hardship and privation to a wife, child, or parent"; 4-A, sole surviving sons of families which lost the others in service; 4-F, the physically, mentally or morally unfit; 5-A, persons 51 or over; 1-C, persons on active duty in the military forces or recently released from service.

The executive order stated that selection of inductees would be made from registrants in 1-A or 1-A-O classifications who have been found acceptable for service in the Armed Forces.

Dentists in the third and fourth categories designated in the special draft bill (text of which appeared on page 491 of the October JOURNAL) will be required to register on some date before January 16 to be set by Maj. Gen. Lewis B. Hershey, Selective Service director.

Text of President Truman's proclamation ordering the October 16 registration appears on page 615b.

DENTISTS NAMED TO ADVISE STATE DRAFT DIRECTORS

At the time of going to press, appointments were announced of dental advisers to Selective Service in 41 states, Alaska, Hawaii and the District of Columbia. Other appointments were expected soon. Appointees are: *Alabama*—George W. Matthews, Birmingham; *Arizona*—William A. Baker, Phoenix; *Arkansas*—J. D. Jordan, Little Rock; *Northern California*—Ernest G. Sloman, San Francisco; *Southern California*—Maurice Smith, Beverly Hills; *Colorado*—Arthur C. Ketcham, Denver; *Connecticut*—William R. Dunleavy, Hamden; *Delaware*—J. Paul Winthrop, Wilmington; *District of Columbia*—E. Milburn Colvin, Jr., Washington; *Florida*—Fred O. Conrad, Tallahassee; *Georgia*—Steve A. Garrett, Atlanta; *Idaho*—Glen B. Crabtree, Idaho Falls; *Illinois*—Robert J. Wells, Chicago; *Iowa*—C. S. Foster, Cedar Rapids; *Kansas*—Arthur J. Buff, Topeka; *Kentucky*—John L. Walker, Louisville; *Maine*—Raymond J. Malone, Portland; *Maryland*—Harry B. McCarthy, Baltimore; *Massachusetts*—Arno M. Bommer, Revere; *Michigan*—John Orton Goodsell, Saginaw; *Minnesota*—Robert O. Green, St. Paul; *Mississippi*—Estes M. Blackburn, Jackson; *Montana*—C. H. Swanson, Columbus; *Nebraska*—Ralph W. Ludwick, Lincoln; *Nevada*—Gilbert W. Eklund, Reno; *New Hampshire*—Robert R. King, Keene; *New Jersey*—Charles P. Crowe, East Orange; *New Mexico*—John S. Eilar, Albuquerque; *New York*—R. A. Montgomery, 143 Wohlers Avenue, Buffalo, and Clyde H. Schuyler, 400 Madison Avenue, New York; *North Carolina*—S. L. Bobbitt, Raleigh; *North Dakota*—C. O. Fergusson, Jamestown; *Ohio*—Joseph C. Longfellow, Bellefontaine; *Oklahoma*—V. V. Jones, Oklahoma City; *Oregon*—George W. Redpath, Portland; *Pennsylvania*—Thomas P. Fox, Philadelphia; *Rhode Island*—Harold J. Pearce, Providence; *South Carolina*—Neil W. Macauley, Columbia; *Tennessee*—Roy O. Elam, Sr., Nashville; *Utah*—R. C. Dalgleish, Salt Lake City; *Virginia*—William Henry Street, Richmond; *Washington*—Jack C. Garretson, Seattle; *West Virginia*—Roy C. Curry, Huntington; *Wyoming*—Joseph E. Beal, Casper; *Alaska*—Clayton L. Polley, Juneau; *Hawaii*—John A. Dawe, Honolulu.

The advisory committee in each state is headed by a physician and includes the State Health Director as well as a member of the dental profession.

PUBLIC HEALTH SERVICE NOW PART OF MILITARY SERVICES

By executive order of the President, Public Health Service has been designated as a part of the military services, according to an announcement by Surgeon General Leonard A. Scheele. Commissions are available for qualified dentists in both the regular and reserve corps. According to Dr. Scheele, new federal legislation making dentists liable for induction under Selective Service will not change the basic placement policies of the Public Health Service. Volunteers for service will be eligible for the $100 a month "incentive bonus."

Inquiries should be directed to the Surgeon General, Public Health Service, Washington 25, D.C., Attention: Division of Commissioned Officers.

RANK OF RESERVE VOLUNTEERS STATED BY OFFICIALS

Information received from Army and Navy officials indicates that dentists not already members of the Reserves, who apply for reserve commissions, will be given ranks according to their years of experience in dental practice and their age.

According to officials of the Fifth Army in Chicago, Army commissions in the

grade of First Lieutenant will be granted to persons having 0-4 years of practice up to age 32. Commissions as Captains will be granted to persons who have practiced from 4-11 years up to age 37; Majorities will be given to those with 11-18 years of practice up to age 42; and Lieutenant Colonel's commissions will be allowed to those who have practiced for more than 18 years and who have not reached age 48.

Officials at the Naval Officer Procurement Office in Chicago state that in the Navy, applicants will be commissioned Lieutenant (jg) if they have from 0-4 years of practice and are 33 years of age or under; they will be commissioned Lieutenant with from 4-11 years of practice if they are 39 years of age or under; they will be commissioned Lieutenant Commander if they have 11-18 years of practice provided they have not reached age 48; and with more than 18 years of practice they may be commissioned Commander.

In general, original appointments are not made in the grades of Colonel in the Army or Captain in the Navy.

ARMY LOWERS DENTAL STANDARDS FOR INDUCTION

Selective Service registrants who are edentulous but whose mouths can be rehabilitated with dentures are now considered suitable for induction into the Army. The lowered Army requirements, which went into effect September 19, bring Army dental standards back to those of World War II. Because of the acute shortage of Army dentists shortly after World War II, requirements were changed to a minimum of eight upper and eight opposite lower teeth.

NEW VA HOSPITALS OPEN WITH DENTAL UNITS

Veterans Administration announced it expected to open six new hospitals during September and six more during October, November and December, providing a total of 2,075 beds for veteran-patients.

Typical of the facilities of the twelve new hospitals are those in the five-story main hospital building at Saginaw, Mich., whose clinics include a dental unit.

Association Affairs

BUSY MEETINGS SCHEDULED FOR HOUSE OF DELEGATES AT NINETY-FIRST ANNUAL SESSION

As THE JOURNAL goes to press reports from the Housing Bureau indicate a record attendance at the ninety-first session of the Association in Atlantic City. The Section on Scientific Sessions has prepared an excellent scientific program for members and guests and the agenda indicates a heavy business session for the House of Delegates. Three matters to be decided by the House were held over from last year: the proposed increase in membership dues, the revised code of ethics and the proposal to merge the duties of the Council on Hospital Dental Service with those of the Council on Dental Education. Among the additional items to be considered are the state dental laboratory accreditation plan, problems of dentistry in the military services, remittance of dues for members in the Amed Forces, inclusion of dentists in the Social Security program, selection of a date for 1951 Children's Dental Health Day, selection of the convention city for 1953, election of officers and the annual budget.

REVISED CODE OF ETHICS WILL BE DISCUSSED

The new code of ethics may become a controversial issue. At the San Francisco session last year, the House referred a revised code, prepared by the Judicial Council, to the Reference Committee on Miscellaneous Business. The Reference Committee's report was tabled until this year's session. After consideration by the Board of Trustees in February, the proposed revised code was published in the May 1950 issue of THE JOURNAL in order to provide members with opportunity for appraisal before being voted on by the Delegates this year.

Final action is expected on the resolution, passed at last year's session, to increase the annual membership dues in the Association from $12 to $20.

Because of the increasing demands on the Council on Hospital Dental Service brought about by the growing number of dental departments in hospitals throughout the country, consideration will be given to moving the activities of this Council to the Central Office and merging them with those of the Council on Dental Education.

A revised plan for the accreditation of dental laboratories under state supervision, compiled by the Council on Dental Trade and Laboratory Relations on the instruction of the House of Delegates at the 1949 annual session, will be put before the House.

Problems of dentistry in the military service will be a major issue in light of the existing dental needs of the Armed Forces and the necessity for meeting these needs without depleting care for civilians. Discussion of the part of the dental profession in civilian defense is also expected to be on the agenda.

Invitations have been received to hold the 1953 session in Cleveland, Ohio, and Miami, Florida. The House must decide which invitation to accept.

In addition to selecting a new President-Elect, three Vice-Presidents and a Speaker of the House, the delegates must elect members of the Board of Trustees from the Third, Fourth, Fifth, Eighth and Ninth Districts.

BOOKLET ON NEW ZEALAND STUDY IS AVAILABLE

A 60-page booklet, *A Study of Dental Public Health Services in New Zealand,* has been published by the Council on Dental Health and is available for distribution. It is a report of a study made for the Association by Allen O. Gruebbel, secretary of the Council, of the dental health scheme in operation in New Zealand.

The booklet contains information regarding social and political developments, climate, and the way of life in New Zealand, in addition to those parts of the report which appeared in the September, October and November issues of THE JOURNAL. Copies are available on request from the Bureau of Public Information at the Central Office.

A.D.A. COUNCIL APPOINTS ORAL PATHOLOGY FELLOW

Francis V. Howell, of the College of Physicians and Surgeons, San Francisco, has been appointed a Fellow in oral pathology to serve at the Armed Forces Institute of Pathology. The announcement was made by Lt. Col. Joseph L. Bernier, executive secretary of the A.D.A. Council on Dental Museum and Registry.

The Council appointed Dr. Howell to a one year's residency at the Institute, beginning on September 1.

A.D.A. INFORMATION AIDS IN HIGH SCHOOL DEBATES

High school debaters are being assisted in their discussions of the welfare state by a packet of information provided by

ada
American Dental Association
ada
PREVENTION
DENTAL CARIES
Tooth Decay
CAUSE: Tooth decay begins in the enamel. Acid is formed in the mouth by the action of bacteria on sugar and certain starches. This acid attacks the tooth and a cavity begins. If decay is neglected, it extends deeper into the tooth and finally reaches the nerve. Most of the damage occurs within 15 minutes after eating. A low sugar diet lessens tooth decay.
CONTROL

Displayed for the first time at the ninety-first annual session of the Association in Atlantic City early this month, this new exhibit, entitled "Dental Caries: Prevention and Control," is now available on loan to dental societies and other health organizations. An electrically operated projection apparatus shows 30 slides in the central panel. The exhibit is 8 feet in width and can be set up and dismantled easily. Information about borrowing the exhibit may be obtained by writing to Allen O. Gruebbel, secretary of the Council on Dental Health at the Central Office, under whose direction the exhibit was completed.

the Association's Bureau of Public Information. Included in the packet are a history of the development of compulsory health insurance bills and a list of pro and con arguments taken from testimony before Congressional committees and other sources, published in THE JOURNAL's special supplement on the subject in

1949. Fact sheets and a current bibliography of books on the subject are also included. Eleven thousand high schools have been notified of the service, made available by the Association "as a public service to American youth who . . . wish to become thoroughly acquainted with the facts and fallacies of a program which can seriously affect the welfare of the individual, the family, the state and the nation."

COUNCIL ON RELIEF AGAIN SETS $100,000 QUOTA

The Association's annual campaign for contributions to the Relief Fund started this month with the mailing to members of Relief Fund Seals. It is expected that the quota of $100,000 will be reached this year.

Last year's Relief Fund received a record total of more than $83,000 in contributions, or 83 per cent of the quota. Sixteen constituent societies contributed 100 per cent or more of their quotas.

The Fund originated in 1907 when California dentists turned over to the Association approximately $3,900 from the San Francisco fire benefit fund. It is administered by the Council on Relief under the chairmanship of John S. Owens of Camden, New Jersey.

Dental Societies

BALTIMORE DENTAL SOCIETY TO HAVE TELEVISED PROGRAM

Television will be utilized by the Baltimore City Dental Society for its program November 13. The program will include presentations on immediate denture service, airbrasive technic demonstrated on a patient, the preparation of an anterior tooth for a jacket crown, and the taking of an impression and pouring of a model.

The program will originate in the dental school of the Baltimore College of Dental Surgery, University of Maryland, and will be televised over a closed circuit by station WMAR-TV. Chairman of the Program Committee is Harry Levin, 3429 Park Heights Avenue, Baltimore.

DAYTON DENTAL SOCIETY PUBLISHES NEW BULLETIN

The Dayton Dental Society published the first issue of the *Dayton Dental Society Bulletin* September 1. The publication will appear monthly from September through June and is under the editorial direction of Earl J. Spencer and five associate editors. Editorial offices are at 1933 North Main Street, Dayton, Ohio.

Byron W. Bailey, Bradford, Vermont, President of the New England Dental Society, and Philip E. Adams, Boston, President of the Association, confer on dental problems of sectional and national importance at the eighty-seventh annual meeting of the New England Dental Society held at the Forsyth Dental Infirmary, Boston, October 4 and 5.

Five hundred people were given free bitewing examinations between August 28 and September 2 in Hazleton, Pennsylvania, when they visited this exhibit of the Hazleton District Dental Society. The exhibit, attended by 5,000 people, was part of The Parade of Business exhibition sponsored by veterans organizations in the Hazleton area, and featured latest developments in business and professional fields.

ST. LOUIS SOCIETY SPONSORS MID-CONTINENT CONGRESS

A Mid-Continent Dental Congress will be held by the St. Louis Dental Society November 26-29 at St. Louis. The program will include both limited attendance and general attendance clinics, scientific and commercial exhibits, dental laboratory demonstrations, a woman's auxiliary program, dental assistants program, and alumni and fraternity luncheons, as well as a dinner dance and entertainment.

A preliminary program may be obtained from the St. Louis Dental Society, 927 Syndicate Trust Building, St. Louis 1, Missouri. T. A. Behrens, Paul Brown Building, is in charge of hotel reservations.

LOUISIANA TO STAGE CANCER DETECTION INSTITUTE

The Louisiana State Dental Society will stage a cancer detection institute in January at the Charity Hospital, New Orleans, in cooperation with Loyola University and the Louisiana State Health Department. Patients will be presented for study and models will be used for demonstrations of detection and treatment.

Dental Education

DENTAL EDUCATORS DISCUSS TEACHING METHODS

Demonstration lectures by leading educators before a group of selected students who were given opportunity for comment and criticism were a feature of the Conference on Dental Teaching in Portland, Oregon, September 11-14. Sponsored jointly by the University of Oregon Dental School and the W. K. Kellogg Foundation, the seminar comprised lectures, demonstrations and discussions of teaching methods, including a presentation by Shailer A. Peterson,

secretary of the Association's Council on Dental Education, who spoke on testing and evaluating devices and their place in higher education. Also on the program was Lloyd E. Blauch, associate chief for education in the health professions in the United States Office of Education, who spoke on the peculiarities of teaching problems in dentistry. Eighty-five educators from six dental schools attended the seminar.

ILLINOIS PRESENTS SECOND TELEPHONE LECTURE COURSE

Current advances in dentistry are again this year to be the subject of round table discussions and symposia conducted by the University of Illinois College of Dentistry in the second of its series of postgraduate courses by telephone. Monthly programs designed for enrolled dental societies will be held on Monday evenings at 7:30 C.S.T. November 13 and December 11, 1950, and January 8, February 12 and March 12, 1951.

The first program, November 13, will be on modern concepts of drug therapy in dental practice, and will include presentations by J. R. Blayney of the University of Chicago, Kurt R. Thoma of Harvard University, T. J. Hill of Western Reserve, C. Philip Miller of the University of Chicago, Floyd G. Ostrander of the University of Michigan, and J. Garrot Allen of the University of Chicago.

Periodontia will be the subject of the second program. Lecturers will include Saul Levy of the University of Illinois, Dickson Bell of the University of California, Henry Goldman of Boston, Olin Kirkland of Montgomery, Alabama, Samuel Charles Miller of New York University, and Bálint Orban of Colorado Springs, Colorado. Other programs are: January 8, clinical and physical appraisal of dental materials; February 12, preventive dentistry; March 12, oral medicine.

Tuition for the entire course is $10.00 and includes a manual and three charts prepared by outstanding educators and practitioners in both medicine and dentistry. Over 250 dental groups in all but two states have enrolled in the course. Although group enrollment is now closed, individual enrollment is still open. Dentists wishing to enroll should apply to the secretary of their local dental society or to Sol Levy, University of Illinois College of Dentistry, Chicago.

COLUMBIA UNIVERSITY OFFERS FELLOWSHIPS IN PEDODONTICS

Two fellowships in pedodontics are available at Columbia University dental school, for the training of dentists in special medicodental problems in the treatment of children with cerebral palsy. The fellowships, each of which carries a stipend of $3,000 to $3,600, were established by the Dental Guidance Council for Cerebral Palsy under the sponsorship of the Cerebral Palsy Society of New York City, Inc.

Further information and application forms may be obtained by writing to Barnet M. Levy, Director of Postgraduate Studies, Columbia University, School of Dental and Oral Surgery, 630 West 168th Street, New York 32.

OHIO STATE UNIVERSITY PLANS EIGHT ADVANCED COURSES

Eight five-day postgraduate courses are scheduled for early 1951 by the College of Dentistry of Ohio State University. The program starts with a course on children's dentistry, by L. S. Pettit, January 29 to February 2, and continues with one by D. P. Synder on oral surgery February 5-9; oral pathology and diagnosis, by H. B. G. Robinson, February 12-16; full denture prosthesis, by Carl O. Boucher, February 19-23; periodontia,

by John R. Wilson, February 26 to March 2; partial denture prosthesis, by V. L. Steffel, February 26 to March 2; endodontia, by J. Henry Kaiser, March 5-9; and anatomy of head and neck, by L. F. Edwards, March 19-23.

The fee for each course is $50 except for oral surgery, the fee for which is $100. Enrollments are limited to ten.

Further information and application blanks may be secured from the Postgraduate Division of the College of Dentistry, Ohio State University, Columbus 10, Ohio.

TORONTO UNIVERSITY OFFERS CONTINUATION COURSES

Orthodontics, cephalometric technics and dental public health are the subjects of continuation courses for dentists offered by the University of Toronto November 6 to 18 at which three leading American dentists will be guest lecturers.

Allan G. Brodie, dean of the college of dentistry of the University of Illinois, and L. Bodine Higley, head of the department of orthodontics at the State University of Iowa, will be guest clinicians of the course in cephalometric technics November 16-18. Philip E. Blackerby, director of the dental division of the W. K. Kellogg Foundation, was scheduled to be guest lecturer at the dental public health conference November 16-18. A course in orthodontics is scheduled for November 6-10. The courses will be under the general direction of Robert E. Moyers, professor of orthodontics and head of the department, and Glenn T. Mitton, associate professor of dental public health.

MARQUETTE OFFERS TWO POSTGRADUATE SEMINARS

The Division of Postgraduate Studies of Marquette University, Milwaukee, Wisconsin, has announced two postgraduate programs for November and December. A seminar on heart disease as it affects the practice of dentistry will be held November 9 and 10 under the chairmanship of L. C. Alexander. Maury Massler, Associate Professor of Pedodontia at the University of Illinois, will present a program on the management of the child heart patient and the management of the adult heart patient in the dental office. Also on the program are specialists in the anatomy, physiology and pathology of the circulatory system and the medical management of heart patients. The meeting will be held in the medical school auditorium in Milwaukee.

A postgraduate course on preventive dentistry for children is scheduled for November 13-15 under the auspices of the departments of orthodontics and pedodontics. The course will consist of daily lectures or seminars as well as clinical experience with patients. It will include detailed study of present caries control measures with a review of the basic pathology of this disease. Preventive orthodontic appliances will be considered with special emphasis on space maintainers and bite planes. Management of thumbsucking and mouthbreathing will be considered.

Details of both courses may be obtained from the Division of Postgraduate Studies, Marquette University School of Dentistry, Milwaukee, Wisconsin.

CANADIAN ASSOCIATION PLANS ACCREDITATION PROGRAM

The dental school inspection and accreditation program of the Association's Council on Dental Education will serve as a pattern for a similar program to be started by the Canadian Dental Association within the next few months.

Don W. Gullet, secretary of the Canadian Dental Association, A. C. Lewis, dean of the College of Education at the University of Toronto, and two leading dental educators from Canada, Harvey

W. Reid and Arthur L. Walsh, met September 8 with three members of the Council, Shailer A. Peterson, secretary, Otto Brandhorst and J. R. Blayney, to obtain the benefits of the Council's experience in the accreditation field. They expect to study the use of the Association's inspection forms and questionnaires in an American dental school before starting their program in Canada, Dr. Peterson said.

UNIVERSITY OF PENNSYLVANIA ANNOUNCES ADVANCED COURSES

Two postgraduate courses are scheduled for January 1951 by the University of Pennsylvania school of dentistry, according to Lester W. Burket, director of Postgraduate Courses.

The first, on oral diagnosis and roentgenology, is designed for the general practitioner and will be conducted by LeRoy M. Ennis, Lester W. Burket and their associates, January 8-19. Enrollment is limited to 16 dentists and the fee is $15.

The second, designed for dentists and dental hygienists interested in public health dentistry and dental health education, will be conducted under the direction of Abram Cohen by a teaching staff of authorities January 22-25. Enrollment is limited to 50 and the tuition fee is $75.

Details may be obtained by writing to Dr. Burket at the Thomas W. Evans Museum and Dental Institute School of Dentistry, 40th and Spruce Streets, Philadelphia.

MASSACHUSETTS DENTISTS PLAN EDUCATIONAL COURSE

The 1951 Educational Course of the Massachusetts Dental Society will be held January 30-31, 1951, at the Hotel Somerset, Boston. Details may be obtained by writing to Maurice Shapiro, Chairman, Educational Committee, Massachusetts Dental Society, 227 Commonwealth Avenue, Boston.

International

GYSI CELEBRATES EIGHTY-FIFTH BIRTHDAY IN ZURICH

The Swiss dental journal, *Schweizerische Monatsschrift für Zahnheilkunde,* reports that Alfred Gysi celebrated his eighty-fifth birthday August 31, 1950, in Zurich. Dr. Gysi is best known for his contributions to the field of dental prosthetics. He made the most scientific study of the problem of articulation, developed an articulator on scientific principles, and made the functional designs of posterior anatomical teeth generally used by dentists today. He studied dentistry in America and was first given recognition for his work in this country.

ARGENTINE DENTISTS STAGE WEEK OF DEMONSTRATIONS

A Dental Week was held by the Argentine Dental Association in its Buenos Aires headquarters October 8-14. The meeting consisted entirely of demonstrations and specialized courses in dentistry and was attended by dentists from other countries as well as Argentina. Pedro Saizar is president of the organization and Antonio Calle Guevara is secretary. Chairman of the arrangements committee was Juan R. Castro.

INTERNATIONAL DEMAND GROWS FOR AMERICAN DENTAL NEWS

Typical of the increasing international demand for the State Department's monthly *Dental Newsletter* is the recent request by the American Embassy in Buenos Aires, Argentina, for an additional 500 copies, according to John M. Robey, Chief of the Editorial Services Branch. After selected members of the Argentina Dental Association had received copies, the entire list of 3,000

members of that association was placed at the disposal of the embassy for distribution purposes.

The *Dental Newsletter,* which began publication last March, is comprised of abstracts supplied by the Association from THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, *Journal of Oral Surgery,* and other dental publications.

INTERNATIONAL CONGRESS INVITES PARTICIPANTS

The eleventh International Dental Congress, to be held in London July 19-26, 1952, under the auspices of the Fédération Dentaire Internationale, will cause such an influx of visitors that the local committee on arrangements has urged that those planning to attend the congress make hotel reservations as early as possible.

The congress, presided over by E. Wilfred Fish of England, will include scientific papers, clinical and table demonstrations, scientific exhibits, films of dental interest, a dental trade exhibition and an oral hygiene exhibition. Excursions, banquets and other social functions will be organized.

Dental research workers, teachers and dental practitioners are invited to contribute presentations to any section of the congress. They should write to G. H. Leatherman, Honorary Secretary, 13 Hill Street, London, W.1. American Express Company is prepared to take care of transportation and hotel reservations, as well as shipment, storage and customs clearance of demonstration material.

All certified dentists are eligible for membership in the congress. Members of other scientific and health professions also may be admitted as active members. Dental and medical undergraduates, relatives of active members, and trade exhibitors may become associate members.

It is pointed out that visitors to the congress may wish to visit the Olympic Games in Finland the week following the meetings.

BLACKERBY APPOINTED DENTAL CONSULTANT BY WHO

Philip E. Blackerby, Jr., who has been appointed dental consultant by the World Health Organization, sailed October 1 for Geneva. Although his duties were not to be clearly defined until he reached Geneva, he expected to study dental programs in Great Britain and Scandinavian countries and on the rest of the Continent, presumably in order to make recommendations to WHO regarding its activities in the field of dental health.

Dr. Blackerby is dental director of the W. K. Kellogg Foundation of Battle Creek, Michigan, and associate director of its international division.

Public Health

TWO STATE SOCIETIES URGE WATER FLUORIDATION

Two more state dental societies, New York and California, have adopted resolutions approving water fluoridation as a caries control measure and recommending adoption of the method by communities.

The Executive Council of the New York society stipulated, however, that in each community where addition of sodium fluoride to the water supply is contemplated, the local dental and medical professions must approve the program and the community must be able to meet and maintain the standards required for such water treatment by the State health

department. In California, the board of directors stipulated that fluoridation be carried out only in cities and towns "large enough to meet the standards of the State Board of Health."

The New York decision, according to the secretary of the society, Charles A. Wilkie, was based on the study being conducted in Newburgh, N. Y., in which, over the last five years, fluoridation of drinking water has resulted in a 30 per cent reduction in the prevalence of caries in children.

Connecticut, New Hampshire and Wisconsin are among other states whose state dental societies have adopted similar resolutions as has also the Cleveland Dental Society in Ohio.

JAYCEES SPONSOR DENTAL HEALTH PROGRAM IN TEXAS

The Texas Junior Chamber of Commerce is sponsoring a statewide public dental health program, planned in cooperation with the Texas State Dental Society. Professional supervision and control of the program, which is centered around National Children's Dental Health Day and fluoridation of municipal water supplies, will be provided by the Texas Society.

Copies of the plan were sent to local health officers, dental societies, Jaycee offices and appropriate community leaders, with literature containing a suggested program for observance of Children's Dental Health Day.

BALTIMORE EXPANDS ITS SCHOOL DENTAL PROGRAM

Four new dental clinics opened in Baltimore public schools September 6, bringing to six the total of clinics operated under the expanding program of dental care for school children inaugurated earlier this year by the city's health department. The clinics are located in areas of the city where the need is greatest.

An estimated 3,700 children in kindergarten and first grade, including second graders who were in the program last year in the first grade, will benefit from the dental inspection program in 21 public and parochial schools during the 1950-51 school year. The children are examined for dental defects by a staff dentist of the health department.

Research

USPHS AWARDS TWENTY-EIGHT DENTAL RESEARCH GRANTS

Grants for dental research projects at 20 universities in 11 states and the District of Columbia have been announced by U. S. Public Health Service. The largest sum, $19,478, goes to J. R. Blayney, Professor of Dental Surgery at the University of Chicago, to aid in continuation of the 15 year study started in 1947 on the effectiveness of fluoridation of water supply in reduction of caries in children. Following is the full list of grants.

California	
Harry M. Leicester, Professor of Biochemistry, College of Physicians and Surgeons of San Francisco, San Francisco.	Mechanism of action of iodoacetic acid and cadmium in caries prevention. ($4,924)
Colorado	
Wm. E. Clapper, Associate Professor of Bacteriology, Medical Center, University of Colorado, Denver.	Study of the prevalence of a specific type of lactobacillus in carious and non-carious individuals. $5,-991)

District of Columbia

Raymond Hayes, Professor of Oral Medicine, College of Dentistry, Howard University, Washington.	Relation of vitamin C blood levels to periodontal disease. ($2,997)

Illinois

J. R. Blayney, Professor of Dental Surgery, University of Chicago.	To determine the value of adding sodium fluoride to a communal water supply to reduce tooth decay in the population. ($19,478)
Stewart A. Koser, Professor of Bacteriology, University of Chicago.	The oral lactobacilli associated with dental caries; a study of their nutritive requirements with special reference to the vitamins and amino acids needed for growth and acid production. ($3,861)
Isaac Schour, Professor of Histology, University of Illinois, Chicago.	Establishment of a quantitative method of indexing gingival disease; also, index gingival disease in representative groups in U.S. ($9,720)
	Histopathology of gingiva in systemic disease. ($10,000)
Evelyn B. Tilden, Professor of Bacteriology, Dental School, Northwestern University, Chicago.	Study of a new medium for the differentiation of strongly acidogenic from weakly acidogenic bacteria in human saliva. ($7,500)
Jos. R. Jarabak, Research Associate in Anatomy, Dental School, Northwestern University, Chicago.	Effect of abnormal muscular tensions upon the sites of growth of the cranium and face. ($6,031)

Indiana

Ralph W. Phillips, Assistant Professor, School of Dentistry, Indiana University, Indianapolis.	Studies on the relation of solubility to hardness of tooth enamel. ($3,218)

Massachusetts

Kathryn F. Stein, Professor of Zoology, Mt. Holyoke College, South Hadley.	Study of malocclusion with special reference to heredity. ($2,050)
James H. Shaw, Assistant Professor, School of Dental Medicine, Harvard University, Boston.	Relation of calcium and phosphorus deficiencies during development of the molar teeth to the initiation and progress of carious lesions in rodents. ($2,916)
Reidar F. Sognnaes, Associate Professor, School of Dental Medicine, Harvard University, Boston.	Further studies on the organic elements of the enamel. ($3,235)
H. A. Zander, Professor of Oral Pediatrics, Dental School, Tufts College, Boston.	Pulp reaction to heat. ($5,292)
Richard S. Manly, Director of Special Research Projects, Dental School, Tufts College, Boston.	Study of chemistry of dental silicates. ($9,828)
Herbert Margolis, Professor of Graduate Orthodontics, Dental School, Tufts College, Boston.	Relationship between muscle forces and dental facial anomalies. ($5,000)

Michigan

Harrison R. Hunt, Professor of Zoology, Michigan State College, East Lansing.	Heredity as a factor in the causation of dental caries in rats. ($4,267)
Floyd A. Peyton, Professor of Dentistry, Dental School	Operating characteristics and

University of Michigan, Ann Arbor.	efficiency of dental handpieces ($4,239)
New Jersey	
Reuben Feltman, Associate Dental Surgeon, Passaic General Hospital, Passaic.	Prenatal and postnatal ingestions of fluoride salts. ($9,917)
New York	
Albert E. Sobel, Department of Biochemistry, Jewish Hospital of Brooklyn, Brooklyn.	Composition of teeth and its relation to human caries. ($12,204)
Maxwell Karshan, Associate Professor of Biochemistry, Columbia University, New York.	Studies on the etiology of periodontoclasia and of certain chronic diseases of the oral mucous membranes. ($9,088)
Gerrit Bevelander, Professor of Histology, College of Dentistry, New York University, New York.	Studies in calcification. ($3,159)
Harold K. Addelston, Associate Professor, College of Dentistry, New York University, New York.	X-ray diffraction studies of the structure of normal and treated enamel of teeth. ($10,983)
Earl O. Butcher, Professor of Anatomy, College of Dentistry, New York University, New York.	Study of effects of experimental denervation and ischemia on teeth in dog and monkey; study of living pulp in rat incisor. ($3,510)
Basil G. Bibby, Director, Eastman Dental Dispensary, Rochester.	Caries producing potentialities of foodstuffs. ($6,172)
Oregon	
Frank G. Everett, Assistant Professor, Dental School, University of Oregon, Portland.	Effect of alloxan diabetes on incidence of dental caries in hamster; clinical and laboratory examination of caries susceptibility in human diabetes before and after treatment. ($4,852)
Pennsylvania	
Wilton M. Krogman, Professor of Physical Anthropology, Graduate School of Medicine, University of Pennsylvania, Philadelphia.	To establish craniofacial growth norms during period of changing dentition; to correlate cephalofacial, dental, somatometric and skeletal age norms. ($8,324)
Virginia	
Seymour J. Kreshover, Director of Dental Research, Medical College of Virginia, Richmond.	Prenatal influence on development of teeth and supporting structures. ($8,320)

General

DENTISTRY-LABORATORY RELATIONS BOOK AVAILABLE

A book containing basic information for dentists regarding means by which the profession, in the best interests of the health of the public, can cooperate with commercial processing laboratories to curb the illegal practice of dentistry, is ready for distribution. Entitled *Leadership in Dentistry-Laboratory Relations,* it is published by the Joint Dental Trade and Laboratory Relations Committee of the First, Second and Tenth District Dental Societies of the State of New York.

Orders for the book should be sent to the Joint Dental Trade and Laboratory Relations Committee, First District Den-

tal Society Headquarters, Hotel Statler, New York 1. Cost of the volume was estimated at $3.50.

BELLINGER IS KANSAS STATE DENTAL HYGIENE DIRECTOR

Willard R. Bellinger has been appointed Director of the Division of Dental Hygiene of the Kanas State Board of Health to succeed the late Leon R. Kramer. As assistant director of the Division for the past five years, Dr. Bellinger brought into the school dental health program all of the 45 counties in the State which were not participating in 1946. His career has included twenty years of private practice after his graduation, in 1925, from Kansas City-Western Dental College, as well as work in dental education and dental public health.

DEATH ANNOUNCEMENT IS CORRECTED

The receipt of incorrect information led to the erroneous listing of a death on page 391 of the September JOURNAL. The Irving Goodman whose death is reported was Irving R. Goodman, Newark, N. J., Ohio Medical University College of Dentistry, Columbus, 1936, and not Irving I. Goodman.

N. Y. COLLEGE OF DENTISTRY REPORTS ON CANCER FINDINGS

That the dentist is in a strategic position in the campaign for early detection of cancer, and that he therefore should be trained and experienced in recognition of its early signs, is made strikingly evident by the experience at New York University's College of Dentistry.

According to the annual report by Dean W. H. Wright, of the 18,353 persons examined by students during 1949-50 and the 10,424 patients registered for treatment, 182 were found to have lesions of the oral cavity. Of these, 8.2 per cent were malignant.

The cancer teaching program of the New York University College of Dentistry, which is aided by Public Health Service and Knights of Pythias grants, is associated closely with the Department of Oral Diagnosis and is extended into the hospital where students observe radiological and surgical treatment of cancer patients. Facilities are available also for consultation by practicing dentists.

FEDERAL GRAND JURY INDICTS TWO FOR ILLEGAL PRACTICE

Using the mails to defraud and practicing dentistry without a license were the subjects recently of federal grand jury indictments of a drug store manager and a dental technician in Little Rock, Arkansas. According to reports, the men are charged with selling an "amazing new discovery, a wonder-working drug to be classified with sulfa and penicillin." The product, BeCal, was apparently marketed by the BeCal Co. Division of the Yancey Laboratories, Inc., between January and May 1950, and advertised as being the result of "three years of clinical research and development." According to postal inspectors, however, analyses of the drug showed that its chief ingredient was acetylsalicylic acid.

The defendants, E. L. Olds and his nephew, Lawrence N. Robinson, were further charged with illegal use of the mails to send dentures to residents in Texas, Alabama and Illinois. Mail and radio advertising stated that the dentures were of fine quality transparent materials made by an "amazing new and scientific process" guaranteed to save the patient money. The firm name of American Dental Co., 7th and Main Streets, Little Rock, was used.

ORTHODONTISTS TO MEET IN LOUISVILLE

The American Association of Orthodontists is already making plans for its 1951 annual meeting April 23-26 at the Seelbach Hotel, Louisville, Ky. Exhibitors are invited to apply for space to Joseph L. Selden, 705 Heyburn Building, Louisville 2.

SOUTHEASTERN ORAL SURGEONS WILL MEET IN NEW ORLEANS

The Southeastern Society of Oral Surgeons will hold its second annual meeting March 2-3, 1951, at the Roosevelt Hotel in New Orleans.

PATIENTS EXPRESS OPINIONS ABOUT THEIR DENTISTS

Of 800 dental patients in Tennessee questioned for the Second District Dental Society by Ben Schohan, a graduate student working for his master's degree in psychology, more than 75 per cent said they thought their dentists kept up to date on latest developments and used good judgment in using only proved technics. Most of them said they considered the quality of a dentist's work more important than his personality. Practically all of them said they thought their dentists did all they could to prevent unnecessary pain, but half of them said it was probably fear of pain that kept people from visiting the dentist.

Most of the patients said they liked to know in advance how much their dental care was going to cost them. More than 70 per cent said they were never overcharged; 20 per cent said they were sometimes overcharged; 2 per cent said their dentist always overcharged. Only 3 per cent wanted their dental care paid for through taxation.

Almost unanimously, the patients believed oral hygiene should be taught in schools. Seventy per cent of them, in fact, believed it a more important subject than geography.

The survey was supervised by Edward E. Cureton, head of the Philosophy and Psychology Department at the University of Tennessee.

A.M.A. FINDS NO EVIDENCE OF IMPROVED BRITISH HEALTH

The quality of medical care in Britain has been diluted by unequal distribution of physicians throughout the population under the National Health Service, according to the report of a five man committee of the American Medical Association which spent six weeks in England early this year. The committee's report, published in *The Journal of the American Medical Association* August 19, states also that despite greatly increased expense of the plan over original estimates there is no evidence of significant improvement in British health. Abuses of the service are evident on all sides, according to the report, and must eventually lead to even tighter government control.

PRESIDENT TRUMAN'S OCTOBER 6 PROCLAMATION GOVERNING REGISTRATION OF DENTISTS

Whereas the Act of September 9, 1950, Public Law 779, Eighty-first Congress, amends Section 4 of Title I of the Selective Service Act of 1948 (62 Stat. 604), as amended, by adding thereto subsection (i), which contains, in part, the following provisions:

"(i) (1) Notwithstanding any other provision of this title, except subsections 6 (j) and 6 (o), the President is authorized to require special registration of and, on the basis of requisitions submitted by the Department of Defense and approved by him, to make special calls for male persons qualified in needed—

"(A) medical and allied specialist categories who have not yet reached the age of fifty at the time of registration, and

"(B) dental and allied specialist categories who have not yet reached the age of fifty at the time of registration.

Persons called hereunder shall be liable for induction for not to exceed twenty-one months of service in the Armed Forces. No such person who is a member of a Reserve component of the Armed Forces shall, so long as he remains a member thereof, be liable for registration or induction under this subsection, but nothing in this subsection shall be construed to affect the authority of the President under any other provision of law to call to active duty members and units of the Reserve components. No person in the medical, dental and allied specialist categories shall be inducted under the provisions of this subsection after he has attained the fifty-first anniversary of the date of his birth.

"(2) In registering and inducting persons pursuant to paragraph (1) of this subsection, the President shall, to the extent that he considers practicable and desirable, register and induct in the following order of priority:

"First. Those persons who participated as students in the Army specialized training program or similar programs administered by the Navy, and those persons who were deferred from service during World War II for the purpose of pursuing a course of instruction leading to education in one of the categories referred to in clauses (A) and (B) of paragraph (1) of this subsection, who have had less than ninety days of active duty in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to the completion of or release from the program or course of instruction (exclusive of the time spent in postgraduate training).

"Second. Those persons who participated as students in the Army specialized training program or similar programs administered by the Navy, and those persons who were deferred from service during World War II for the purpose of pursuing a course of instruction leading to education in one of the above categories, who have had ninety days or more but less than twenty-one months of active duty in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to the completion of or release from the program or course of instruction (exclusive of the time spent in postgraduate training).

"Third. Those who did not have active service in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to September 16, 1940.

"Fourth. Those not included in the first and second priority who have had active service in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to September 16, 1940."

And Whereas Section 6 of the aforesaid Act of September 9, 1950, reads as follows:

"For the purposes of this Act, the term 'allied specialist categories' shall include, but not be limited to, veterinarians, optometrists, pharmacists, and osteopaths."

And Whereas Title I of the Selective Service Act of 1948 contains, in part, the following provisions:

"Sec. 6. (K) No exception from registration, or exemption or deferment from training and service, under this Title, shall continue after the cause therefor ceases to exist."

"Sec. 10. (B) The President is authorized:

"(1) To prescribe the necessary rules and regulations to carry out the provisions of this Title;

"(5) To utilize the services of any or all departments and any and all officers or agents of the United States, and to accept the services of all officers and agents of the several states, territories, and possessions, and subdivisions thereof, and the District of Columbia, and of private welfare organizations, in the execution of this Title;

"(C) The President is authorized to delegate any authority vested in him under this

Title, and to provide for the subdelegation of any such authority."

And Whereas Bachelors of Medicine, Doctors of Medicine, Doctors of Dental Surgery, Doctors of Medical Dentistry, Doctors of Veterinary Surgery, and Doctors of Veterinary Medicine, are urgently needed for service in the Armed Forces of the United States:

Now, Therefore, I, Harry S. Truman, President of the United States of America, acting under and by virtue of the authority vested in me by Title I of the Selective Service Act of 1948, as amended, do proclaim the following:

1. Every male person who participated as a student in the Army Specialized Training Program or any similar program administered by the Navy, or was deferred from service during World War II for the purpose of pursuing a course of instruction leading to education in a medical, dental, or allied specialist category, and has had less than twenty-one months of active duty in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to the completion of, or release from, such program or course of instruction (exclusive of time spent in postgraduate training), and who, on the day or any of the days hereinafter fixed for his registration (A) shall have received from any school, college, university, or similar institution of learning one or more of the degrees of Bachelor of Medicine, Doctor of Medicine, Doctor of Dental Surgery, Doctor of Medical Dentistry, Doctor of Veterinary Surgery, and Doctor of Veterinary Medicine, (B) is within any of the several states of the United States, the District of Columbia, the Territory of Alaska, the Territory of Hawaii, Puerto Rico, or the Virgin Islands, (C) is not a member of any reserve component of the Armed Forces of the United States, and (D) shall not have attained the fiftieth anniversary of the day of his birth is required to and shall on that day or any of those days present himself for and submit to registration before a duly designated registration official or Selective Service Local Board having jurisdiction in the area in which he has his permanent home or in which he may happen to be on that day or any of those days.

2. The special registration of the male persons required to submit to registration by paragraph numbered 1 hereof shall take place in the several states of the United States, the District of Columbia, the Territories of Alaska and Hawaii, Puerto Rico, and the Virgin Islands between the hours of 8:00 A.M. and 5:00 P.M. on the day or days hereinafter designated for their registration, as follows:

(A) Persons who shall have received any of the degrees above referred to on or before October 16, 1950, shall be registered on Monday, the 16th day of October, 1950.

(B) Persons who receive any of the degrees above referred to after October 16, 1950, shall be registered on the day they receive any such degree, or within five days thereafter.

(C) Persons who shall have received any of the degrees above referred to and who enter any of the several states of the United States, the District of Columbia, the Territory of Alaska, the Territory of Hawaii, Puerto Rico, or the Virgin Islands after October 16, 1950, shall be registered on the day of such entrance, or within five days thereafter.

3. Every male person who has not had active service in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to September 16, 1940, and every male person not included in the first or the second of the priorities defined in Section 4 (1) (2) of the Selective Service Act of 1948, as amended, who has had active service in the Army, the Air Force, the Navy, the Marine Corps, the Coast Guard, or the Public Health Service subsequent to September 16, 1940, who on the day or any of the days hereafter fixed by the Director of Selective Service for his registration (A) shall have received from a school, college, university, or similar institution of learning one or more of the degrees of Bachelor of Medicine, Doctor of Medicine, Doctor of Dental Surgery, Doctor of Medical Dentistry, Doctor of Veterinary Surgery, and Doctor of Veterinary Medicine, (B) is within any of the several states of the United States, the District of Columbia, the Territory of Alaska, the Territory of Hawaii, Puerto Rico, or the Virgin Islands, (C) is not a member of any reserve component of the Armed Forces of the United States, and (D) shall not have attained the fiftieth anniversary of the day of his birth is required to and shall on that day or any of those days present himself for and submit to registration before a duly designated registration official or Selective Service Local Board having jurisdiction in the area in which he has his permanent home or in which he may happen to be on that day or any of those days.

4. The Director of Selective Service is hereby authorized and directed to fix the date or dates for the special registration required under paragraph numbered 3 hereof: Provided, that the date or dates so fixed shall not be later than January 15, 1951.

5. The Director of Selective Service is hereby authorized to require special registration of, and fix the date or dates of registration for, all other persons who are subject to

registration under Section 4 (1) of the Selective Service Act of 1948, as amended, and who are not required to register under or pursuant to this proclamation.

6. All orders and directives of the Director of Selective Service issued pursuant to paragraph numbered 4 or paragraph numbered 5 hereof shall be published in the Federal Register.

7. (A) A person subject to registration under or pursuant to this proclamation who, because of circumstances beyond his control, is unable to present himself for and submit to registration during the hours of the day or any of the days fixed for registration shall do so as soon as possible after the cause for such inability ceases to exist.

(B) Every person subject to registration under or pursuant to this proclamation who has registered in accordance with Proclamation No. 2799 of July 20, 1948, issued under the Selective Service Act of 1948, as amended, and the regulations prescribed thereunder, shall, notwithstanding such registration, present himself for and submit to registration as required by or pursuant to this proclamation.

(C) The duty of any person to present himself for and submit to registration in accordance with Proclamation No. 2799 of July 20, 1948, issued under the Selective Service Act of 1948, as amended, and the regulations prescribed thereunder, shall not be affected by this proclamation.

8. Every person subject to registration under or pursuant to this proclamation is required to familiarize himself with the rules and regulations governing such registration and to comply therewith.

9. I call upon the Governors of each of the several states, the Territories of Alaska and Hawaii, Puerto Rico, and the Virgin Islands and the Board of Commissioners of the District of Columbia, and all officers and agents of the United States and all officers and agents of the several states, the Territories of Alaska and Hawaii, Puerto Rico, the Virgin Islands, and the District of Columbia, and political subdivisions thereof, and all local boards and agents thereof appointed under the provisions of Title I of the Selective Service Act of 1948, as amended, or the regulations prescribed thereunder, to do and perform all acts and services necessary to accomplish effective and complete registration.

10. In order that there may be full cooperation in carrying into effect the purposes of Section 4 (1) of Title I of the Selective Service Act of 1948, as amended, I urge all employers and government agencies of all kinds—federal, state, territorial, and local—to give those under their charge sufficient time in which to fulfill the obligations of registration incumbent upon them under the said Act and under or pursuant to this proclamation.

In Witness Whereof, I have hereunto set my hand and caused the Seal of the United States of America to be affixed. . . .

Harry S. Truman

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editors reserve the right to edit all communications to fit available space and require that all letters be signed. Signatures will be deleted before publication at the request of the author. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

EXCERPTS FROM A LETTER RECEIVED BY AN AMERICAN DENTIST FROM AN ENGLISH COLLEAGUE

Very many thanks for the lovely cards. There have been a few changes in my life since last New Year.

I bought a practice and a bungalow in Dunoon. Dental practitioners all over the country are extremely busy with the new Health Service. There are very few dentists outside the scheme now, I should say less than 10 per cent and perhaps a good bit less now. It is impossible to make a living outside it, unless you are already well established in a very high class practice. Fees paid by the Health Service at the outset were much higher than the average dentist demanded privately so most dentists went in right away. After six months the fees were cut as much as 20 per cent in some treatments. Everything was free and easy to start with but now they are cutting fees as much as possible, refusing payments because some regulation or other has been neglected, and generally developing into a real Civil Service department with an endless stream of forms and letters and queries. No matter how often you check forms there is always a little thing missing which means correspondence each time.

The Service is naturally abused by both dentists and public so we get more and more red tape as time goes on.

It is wonderful how opposition can be overcome. Most of the people who made the most fuss about the Service and did most of the original opposing are now in high positions in the Service, so when opposition has been most needed lately we have not got the strength to fight. The Minister of Health made the last fee cut without consulting the Dental Associations. There was a fuss about it but nothing came of it. Soon we shall be underpaid and overworked.

I have a very busy day every day. I have to spend most of my evenings filling out forms and writing letters about cases. I have a house that needs all sorts of odd jobs done, but I can't find time. Labour generally is very expensive so my odd jobs about the house I do myself. Now that I have to wash the odd "nappie" I don't know which way to turn first. You see what you are in for if you lose your freedom. I sincerely hope the profession in America will remain free.

A CORRECTION

I appreciate your offer to publish the correction of Dr. Wainwright's misquotation, in the August, 1950 JOURNAL, of the formula of my mouthwash as published in your issue of November, 1948.

My formula provided for 80 grams of urea and 40 grams of sodium alkyl aryl sulfonate to a gallon of sterile water. This represents a two per cent urea in a one per cent surface-active media which does not inhibit urease action.

Dr. Wainwright used a 1.7 per cent urea to achieve penetration of intact enamel and dentin, and this has an important bearing upon the anti-caries activity of low percentage urea concentrations versus those of Stephan and of Henschel who utilize high urea concentrations. Since mine is a two per cent urea it is in the same category as Wainwright's, and has been shown by his findings to have penetrating properties which were heretofore questioned.

Work which I have since done indicates that the low percentage urea concentrations probably react with urease which is produced by oral microorganisms. The catalytic action of enzymes has been shown to multiply the chemical reaction of a compound such as urea by as much as two million times. Thus, a low urea concentration which stimulates urease-urea reaction is much more effective than a high urea concentration which inhibits urease-urea reaction.

David J. Goodfriend, Philadelphia

COUNCIL ON LEGISLATION

New army dental bill

On September 14 a new army dental bill (S 4156) sponsored by the Association was introduced in the Senate by Sen. Lester D. Hunt (D., Wyo.). On the same day Rep. Walter E. Brehm (R., Ohio) introduced a companion bill (HR 9658) in the House of Representatives, and on September 18 Rep. L. Mendel Rivers (D., S. Car.) introduced an identical bill (HR 9690) in the House. These bills are designed to give statutory backing to the organization of the dental services within the army so as to enable dentists in the Army Dental Corps to function more efficiently. The text of the proposed legislation and an explanation of its provisions prepared by Francis J. Garvey, secretary of the Council on Legislation, follow:

THE BILL

To amend the Army Organization Act of 1950 to provide more efficient dental care for the personnel of the Army, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 208 (b) of the Army Organization Act of 1950 is amended by adding thereto the following sentence: "Such Assistant Surgeon General shall be Chief of the Dental Corps and shall be responsible to the Surgeon General and the Secretary of the Army for making recommendations on all matters concerning the dental health of the Army."

SEC. 2. Section 307 of the Army Organization Act of 1950 is amended to read as follows:

"SEC. 307. (a) There shall be in the Army an Army Health Service, which shall consist of the Surgeon General and the Assistant Surgeons General authorized by sections 206 and 208, respectively, of this Act, the Medical Corps, the Dental Corps, the Veterinary Corps, the Medical Service Corps, the Army Nurse Corps, and the Women's Medical Specialist Corps. Each such corps shall consist of Regular Army officers appointed and commissioned therein and such other members of the Army as may be assigned thereto by the Secretary of the Army, but the Secretary shall not assign to any corps of the Army Health Service any officer who has been appointed or commissioned in some other corps of the Army Health Service, or in some other special branch, or in the Regular Army without specification of branch. The Medical Service Corps, the Army Nurse Corps, and the Women's Medical Specialist Corps shall include Chiefs and Assistant Chiefs, and shall include the sections as now prescribed by law.

"(b) (1) The Secretary of the Army shall determine the authorized strength of the Dental Corps at a number which will provide approximately two dental officers for each one thousand personnel on active duty with the Army.

"(2) The Secretary of the Army shall prescribe by regulation for the training of an adequate number of personnel in military occupational specialties auxiliary or ancillary to the practice of dentistry and for the assignment of such personnel in effective numbers to duty with personnel of the Dental Corps.

"(c) The Secretary of the Army shall, by regulation, require the Chief of the Dental Corps to (1) establish professional standards and policies for dental practice; (2) conduct inspections and surveys for maintenance of such standards; (3) initiate and recommend action pertaining to Dental Corps and auxiliary personnel strength, appointments, advancement, training assignment and transfer of dental personnel; and (4) serve as the adviser to the Army Health Service on all matters relating directly to dentistry.

"(d) The Secretary of the Army shall, by

regulation, provide for the organization of the dental service throughout the Army, so that the senior dental officer for each major command, Army division, or other headquarters or installation shall be directly responsible to the commanding general or officer for all professional, technical, and administrative matters pertaining to the dental health of the command, including, but not limited to, the assignment or detailing of dental officers and assigned auxiliary personnel within the command, division, headquarters, or installation: *Provided*, That nothing herein shall be deemed to prevent the Secretary from providing for the assignment of dental officers as commanding officers of appropriate units or installations."

SEC. 3. The provision of this Act shall be applicable to the Army as defined in section 301 of the Army Organization Act of 1950.

EXPLANATION OF THE BILL

Sec. (1) This section amends the Army Organization Act of 1950 so as to designate the chief dental officer of the army as "Chief of the Dental Corps." It makes him responsible to the Surgeon General and to the Secretary of the Army for making recommendations on all matters concerning the dental health of the army.

There is presently no such title as Chief of the Dental Corps; however, the Chief of Corps title is held by the Army Nurse Corps (10 USC 165), the Medical Service Corps (10 USC 156 (b)), and the Women's Medical Specialist Corps. The heads of the Veterinary and Medical Corps are not so designated.

This amendment is intended to fix the responsibility of the senior dental officer of the army. It will not conflict with the theory of army administration as announced by former Secretary Gray in the hearings on the Army Organization Act (Committee Print 187, House Armed Services Committee, 81st Congress, page 6023) where he says "We would like to see that the Congress does not prescribe for officers who are subject to the responsibility of the Secretary, duties and functions which he cannot change."

Throughout this bill an attempt is made to place the direct responsibility for any action on the Secretary of the Army. For this reason no direct power is delegated to the dental corps. Instead, Congress, the lawful superior of the Secretary of the Army, directs that official to issue regulations which will accomplish certain effects within the dental corps.

Sec. (2) of the bill amends Section 307 of the Army Organization Act. The first subsection (a) of Section 307 is changed only to the extent that the present name Army Medical Service is changed to Army Health Service. The term "medical" is not sufficiently comprehensive to define the true meaning of the various health activities concentrated under the general jurisdiction of the Surgeon General of the army. It is believed that the proposed name provides a more accurate denomination for this group of activities. The remainder of the subsections are new.

Subsection 307 (b) (1) requires the Secretary to fix the authorized strength of the dental corps at a number which will provide approximately two dental officers for each thousand personnel on active duty with the army. The Officer Personnel Act of 1947 (10 USC 506 (d)) provides that the Secretary of the Army shall determine the authorized active list of commissioned officers strength of each of the several corps of the medical department of the regular army. Sec. 307 (b) (1), as proposed in this bill, is consistent with the present law but is broader in its scope in that it fixes the ratio of dental officers in relation to active duty strength personnel instead of within the limits of authorized commissioned personnel. This ratio is consistent with the present policies of the army.

Sec. 307 (b) (2) is entirely new. It attempts to solve the problem of providing an adequate number of trained dental assistants, hygienists and laboratory personnel for service with the dental corps. Since the dental corps consists exclusively of commissioned officers who are dentists, it would not be feasible to designate the additional personnel as members of that

corps; however, it is believed that under the provisions of the bill sufficient numbers of necessary personnel, commissioned or enlisted, can be assigned for duty with dentists and that while so assigned they would be under the control of the dental corps. This section does not conflict with the army policy of assigning personnel to duty by Military Occupational Specialty number. This subsection is consistent with existing Section 307 which provides that each corps of the medical service shall consist of regular army officers appointed and commissioned therein and such other members of the army as may be assigned thereto by the Secretary of the Army.

Sec. 307 (c) is derived from section 3 of the Navy Dental law (5 USC 456 (c)). It differs from the wording proposed in the 1949 dental bills, but it is believed that the same effect will be accomplished and that it is desirable to have parallel wording for the various functions of the dental corps of the several services. The authority of the Secretary of the Army is not interfered with, but responsibility would be placed in the Chief of the Dental Corps to perform those functions which should inherently flow from his office and title.

Sec. 307 (d) is derived from Army Regulations 40-15 as promulgated on 14 September, 1948, and which follows closely the sense of Section (6) (c) of those regulations.

Sec. (3) is intended to insure that this Act will extend to and cover the activities of reserve officers of the dental corps when on active duty.

It is believed that this bill can be administered effectively by the army without the necessity for substantial changes in its present organization; it will, however, give statutory backing to the organization of the dental services within the standard military framework, and will place proper emphasis upon the professional status of the dentists so that they will function within the army with the same efficiency toward the health of the patient as does the civilian profession.

COUNCIL ON DENTAL EDUCATION

Report on the preparation of dental hygiene students and their placement after graduation

A survey has recently been conducted to determine a number of facts about the students now enrolled in schools for the training of dental hygienists, information on the number of dental hygiene graduates that find employment as dental hygienists, and the cost of the dental hygiene program to the dental hygiene student.

In the school year from July 1, 1948, to June 30, 1949, there was a total of 538 dental school graduates from the eighteen schools surveyed. All except one of the schools keep a record of their alumni and assist in the placement of their graduates. Nearly all of these graduates (97 per cent) sought employment as dental hygienists and practically all of these (99 per cent) found that type of employment. The following tabulation gives the percentage of graduate dental hygienists that found employment in vari-

ous types of services, agencies, or institutions:

Dental offices	72.6
Public schools	13.0
Hospitals	4.8
Civil service (federal)	3.4
Civil service (state)	2.5
Interning in dental schools	1.7
Colleges and universities	1.0
Industrial clinics, children's clinics, group health, Waves	0.8
Unknown	0.4

Of the 538 dental hygiene graduates, 7.4 per cent received a bachelor's degree at the same time that they received their certificate and 9.1 per cent continued some college work for at least a short time.

According to the minimum requirements of the Council on Dental Education, all entering dental hygiene students must have completed a high school education and have majored in a college preparatory course. The amount of predental hygiene training that the most recent group of freshmen had had is as follows:

Amount of previous education	Percentage
Only high school training	69.3
More than high school but not more than 1 year of college	13.6
Two years of college	12.1
Three years of college	1.7
Four or more years of college	3.5

From this, it will be observed that about one-third had more than the high school minimum.

From this survey, it was discovered that the average total cost to the student for the two year course, exclusive of living costs, is $725.32 although the range is from $137 to $1,200. The average tuition is $477.44 with a range of $000.00 to $999.00 and the average charge for miscellaneous fees is $267 with a range of $115.00 to $800.00.

COUNCIL ON HOSPITAL DENTAL SERVICE

Report of survey on staff positions held by dentists in hospitals

As one of the projects of the Council on Hospital Dental Service, a roster of dentists serving on hospital staffs has been compiled. The figures to date show 7,450 dentists holding such positions in the United States. This means approximately one dentist in ten is so serving.

Of the possible 1,806 hospitals which report dental departments, 1,512 have sent in the names of dentists who are serving on their staffs. As time goes on, it is expected that the other hospitals will report and swell the total.

Unfortunately it will be impossible to give recognition to this large group of dentists in the *American Dental Directory,* as it has already gone to press. A request has been made to the Board of Trustees that a special listing be made in the next *Directory* to include this group.

The hospital dental services are doing a much needed job of rendering dental services to the acutely and chronically ill patients. They are also solving our problems of medicodental relationships in a practical manner in the hospitals where

Tabulation of hospital staff positions held by dentists

State	Number of hospitals reporting	Number of staff positions held by dentists	State	Number of hospitals reporting	Number of staff positions held by dentists
Alabama	18	84	New Hampshire	8	43
Arizona	10	32	New Jersey	75	431
Arkansas	9	38	New Mexico	13	29
California	73	438	New York	208	1,934
Colorado	21	65	North Carolina	26	158
Connecticut	26	164	North Dakota	3	9
Delaware	8	24	Ohio	75	365
Florida	24	94	Oklahoma	19	53
Georgia	16	69	Oregon	12	49
Idaho	7	11	Pennsylvania	158	636
Illinois	83	318	Rhode Island	12	93
Indiana	32	117	South Carolina	9	15
Iowa	23	63	South Dakota	7	12
Kansas	14	56	Tennessee	29	91
Kentucky	22	77	Texas	53	193
Louisiana	21	139	Utah	7	25
Maine	14	50	Vermont	6	20
Maryland	33	178	Virginia	24	75
Massachusetts	78	430	Washington	17	60
Michigan	56	213	West Virginia	23	61
Minnesota	23	62	Wisconsin	28	85
Mississippi	11	30	Wyoming	3	4
Missouri	33	114	District of Columbia	10	65
Montana	5	18	Hawaii	6	8
Nebraska	11	24	Puerto Rico	8	21
Nevada	2	7	Total	1,512	7,450

the two professions meet and work with a common purpose.

The accompanying table shows the states and territories with dental departments, and gives the number of hospitals in each as well as the number of dentists serving.

Edward C. Dobbs, Chairman

COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS

The laboratory issue: III. The training of technicians

Wide variation yet exists in the training of dental laboratory technicians. In general, three methods are in operation at the present time: (1) the apprenticeship system in commercial dental laboratories; (2) training in commercial schools; (3) training in schools or courses organized in educational institutions on a nonprofit basis. The enactment of Public Laws 16 and 346, relating to the education of

This article is the third in a series of six prepared by the Council on Dental Trade and Laboratory Relations on the relationship between dentistry and one of its most important auxiliaries.

veterans, led to an expansion of the offerings of such training on a commercial basis.

As of July 1, 1947, the Council on Dental Education of the American Dental Association made an inquiry into the then existing situation. With the aid of information furnished by the Veterans Administration, by dental laboratories and by state educational authorities it was found that on the job training was being offered to 4,792 students in laboratories covering every state in the Union. The range was from 2,575 students in New York and 495 in New Jersey to 3 in New Mexico and 2 in South Carolina. The character of the training afforded was highly practical and its quality varied with the efficiency of the laboratories in which the instruction was given.

Eleven states, Colorado, Connecticut, Indiana, Louisiana, Massachusetts, New Jersey, New York, Ohio, Pennsylvania, Texas and Virginia, reported the operation of 19 proprietary schools enrolling 2,391 students. The range was from 3 schools in New York with an enrollment of 1,145 to 1 school in Connecticut with an enrollment of 11 students. There was no uniform pattern of admission requirements or of length and content of the curriculum in these proprietary schools. The admission requirement varied from nothing to the completion of a high school course or the equivalent. The length of the course varied from a few weeks to two years. Some of these schools issued elaborate outlines of the subjects to be taught and others were content with brief generalizations.

Four courses in nonproprietary educational institutions were found to be in operation, 3 in New York, enrolling 220 students, and 1 in Tennessee enrolling 24 students. Two additional courses have been established since the inquiry was made. It seems desirable to record the principal details concerning these nonproprietary undertakings.

A course for the training of dental laboratory technicians was introduced in the Central Commercial High School in New York City in 1934. A junior high school diploma or the completion of one year of high school is required for admission with satisfactory ratings in general intelligence and achievement tests and in mechanical aptitude tests with dental laboratory materials and tools. The course covers three academic years with four periods daily. An average of 20 students is graduated each year. The school is able to place all of its graduates who wish to remain in the trade in dental laboratories as apprentices. A few have gone on to study dentistry. Very few seek or obtain positions in dental offices. A similar course is in operation in The George Westinghouse Vocational School in Brooklyn.

A course in dental laboratory technology was established in the State Institute of Applied Arts and Sciences in Brooklyn, New York in 1946. The Institute was then under the direction of the State Education Department and has since come under the immediate control of the State University. An applicant must be at least a high school graduate and must meet certain psychometric tests. The course covers two years of eleven months each with thirty semester hours each week. The graduates number 165 and the normal enrollment is 125. The students secure employment upon graduation about equally in laboratories and in dentists' offices.

A course in dental laboratory technology leading to a certificate was established in the College of Dentistry of the Ohio State University at Columbus in 1947. An applicant must be a graduate of an accredited high school with credits including 3 units in English, 1 unit in American history and civics, 1 unit in algebra and 1 unit in plane geometry. In addition he must meet all the requirements of the University entrance board, must have good vision and must qualify in the aptitude test prescribed by the

Council on Dental Education of the American Dental Association. The course covers two academic years and undertakes to train the technician in all the operations he will be called on to perform by dentists. Two classes have been graduated numbering 24 in all. The graduating class in 1951 will have 18 students. All the graduates have secured employment or have engaged in business on their own account or are pursuing further education. Three are employed in dental schools assisting in laboratory work, 5 in dental offices, 7 in dental laboratories, 2 in sales positions with dental manufacturers, 5 are engaged in laboratory business on their own account and 2 have transferred to a dental curriculum.

A workshop for dental laboratory technicians was established by the University of California Extension Division at Los Angeles in 1947. The Dean of the College of Dentistry of the University of California at San Francisco serves on the Advisory Board of the workshop. Graduation from high school or the equivalent is required for admission, including one year of chemistry or physics. In addition the applicant must pass an aptitude test to determine his mechanical ability and finger dexterity. The course covers three semesters of 16 weeks in length and includes 1920 clock hours. One hundred and nine students have been graduated. The current enrollment is about 40. Mainly the graduates secure employment in dental offices. The course is designed primarily to train technicians for such service rather than for work in commercial laboratories.

A course on the post high school level is also in operation in the School of Dentistry of Meharry Medical College at Nashville, Tennessee.

In 1946 the Council on Dental Education announced requirements for "the accrediting of a school for the training of dental laboratory technicians under the supervision of an accredited dental school or other responsible agency established on a nonprofit basis." Since formal training as contemplated in these requirements is still in the experimental stage no courses have as yet been accredited. The course as outlined covers two academic years and is based on high school graduation.

It seems likely that the training of dental laboratory technicians for their trade will follow the evolutionary processes which have characterized the learned professions. Time was when the apprenticeship system was the only method of training for physicians, dentists, lawyers, professional engineers and architects. The next step was the establishment of formal courses of study organized mainly as business enterprises for profit. Today, acceptable professional education in these fields is largely in the hands of nonprofit educational institutions. This does not mean that in the evolutionary process apprenticeship training and training in commercial schools have been without value. The great majority of present day dental laboratory technicians have been trained in that way.

Apprenticeship training in connection with formal education or supplementing it will always be of value. The history of education tells us that the commercial school tends to disappear. It seems quite certain that there are now too many schools of this type, hastily conceived and poorly organized and conducted.

The pattern advanced by the Council on Dental Education points the way. The content of the course and the objectives of it are under consideration by the Council on Dental Education and the Council on Dental Trade and Laboratory Relations. The common purpose is to train technicians in all of the mechanical processes which a dentist may carry on in his own laboratory or which the technician may be called on to perform in a commercial dental laboratory. The general aim is to confine the course to voca-

tional and practical ends and to make it intensive enough for the graduate to begin the work of his trade in the private laboratory of a dentist or in a commercial laboratory. No claim is made that training is finished or ended with the completion of the course. Learning by doing will then begin in earnest for the technician. That the importance and dignity of the craft as an adjunct of the dental profession calls for formal training in nonprofit educational institutions becomes more evident day by day. Perhaps a dozen or so of such courses strategically located and administered under the guidance of the appropriate Councils of the American Dental Association would meet the demands and needs of the trade. That the wholesome cooperation of the dental laboratory industry and the dental profession is desirable to this end goes without the saying.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics of the American Dental Association has been described in a previous report (J.A.D.A. 40:489, April, 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions of acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Acetidine Tablets with Codeine Phosphate ¼ gr. (Sharp & Dohme, Inc.): Each tablet is stated to contain codeine phosphate, 0.0162 Gm.; acetophenetidin, 0.1176 Gm.; caffeine, anhydrous, 0.0294 Gm.; acetylsalicylic acid, 0.1770 Gm., and excipients. See *A.D.R.*, ed. 15, p. 166.

Acetidine Tablets with Codeine Phosphate ½ gr. (Sharp & Dohme, Inc.): Each tablet is stated to contain codeine phosphate, 0.0324 Gm.; acetophenetidin, 0.1176 Gm.; caffeine, anhydrous, 0.0294 Gm.; acetylsalicylic acid, 0.1770 Gm., and excipients. See *A.D.R.*, ed. 15, p. 166.

NOTE: Because of the presence of the codeine phosphate in the above-listed tablets, the use or prescription of the items requires a narcotic license.

Penicillin Troches, 5000 Units (Schenley Laboratories, Inc.): Stated to contain crystalline penicillin G potassium in a flavored base. See *A.D.R.*, ed. 15, p. 46.

Buffered Penicillin Tablets, 50,000 Units, 100,000 Units, 250,000 Units and 500,000 Units (Schenley Laboratories, Inc.): Stated to contain crystalline peni-

cillin G potassium, calcium carbonate and excipients. Trademark: Orapen. See *A.D.R.*, ed. 15, p. 46.

Waite's Topical Paste (Cook-Waite Laboratories, Inc.): Each 100 Gm. is stated to contain tetracaine HCl, 2.28 Gm.; benzalkonium chloride, 10 Gm.; glycerin, 10 Gm.; barium sulfate powder, 10 Gm.; methyl cellulose, 2.92 Gm., and distilled water., q.s. See *A.D.R.*, ed. 15, p. 36.

Benzocaine-Chlorobutanol Solution (J. C. Lawless): Each 100 cc. is stated to contain benzocaine, 16.5 Gm.; chlorobutanol, 5 Gm.; clove oil, 0.5 cc.; alcohol, 78 cc., and color. See *A.D.R.*, ed. 15, p. 37.

Ethyl Aminobenzoate Tablets (J. C. Lawless): Each tablet is stated to contain ethyl aminobenzoate, 0.016 Gm.; cane sugar; milk sugar, and flavoring. See *A.D.R.*, ed. 15, p. 37.

Phenobarbital Tablets, ½ grain, 1½ grains (J. C. Lawless): See *A.D.R.*, ed. 15, p. 162.

Ace-Caf-Edine Tablets (J. C. Lawless): Each tablet is stated to contain acetylsalicylic acid, 0.23 Gm.; acetophenetidin, 0.15 Gm.; caffeine alkaloid, 30 mg., and excipients. See *A.D.R.*, ed. 15, p. 166.

Potassium-Sodium Carbonate Mixture (J. C. Lawless): Each 100 Gm. is stated to contain potassium carbonate, 55.56 Gm.; sodium carbonate monohydrate, 11.11 Gm., and glycerin, 33.33 Gm. See *A.D.R.*, ed. 15, p. 13.

Vitamin C (Ascorbic Acid) Tablets (J. C. Lawless): Each tablet is stated to contain ascorbic acid, 100 mg., and excipients. See *A.D.R.*, ed. 15, p. 134.

GROUP B

Listing of products in group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics and the Bureau of Chemistry. It is the Council's opinion that Group B products may be promoted for special use and study.

GROUP C

Listing of products in group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that group C products require further study by qualified investigators.

GROUP D

Listing of products in group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

Nineteen fifty survey of the dental profession. IV. The dentist's work year

The survey questionnaire[1] included questions on the number of patients treated in 1949, the estimated percentage of patients who returned for all recommended dental care, and the division of the year into number of weeks worked, weeks on vacation and weeks spent in other activities.

1. The first three articles of this survey appeared in the August, September and October 1950 issues of the Journal of the American Dental Association in the section entitled "Reports of Councils."

Table 30 • Average number of weeks worked in dental office in 1949 by age of dentist

Age of dentist	Number of weeks worked	
	Mean	Median
–29	45.2	49
30–39	47.0	48
40–49	47.1	48
50–59	46.1	47
60–69	45.6	47
70–	44.9	47
All ages	46.5	48

NUMBER OF WEEKS WORKED IN 1949

The mean number of weeks worked in the dental office in 1949 by all respondents was 46.5 and the median was 48 (Table 30). However, these averages include dentists who put in less than a full year, owing to illness, graduate study, other employment or other types of activity. If those who worked less than 40 weeks are eliminated, the remainder worked a mean of 47.6 weeks.

The modal (most common) number of weeks worked was 48, including 20.9 per cent of the dentists (Table 31). Fifty weeks was the next most common length of work year with 18.9 per cent of the dentists. Three out of five dentists (59.6 per cent) worked 48 weeks or more in their dental offices.

Table 31 • Percentage distribution of dentists and mean number of patients by number of weeks worked in dental office in 1949

Number of weeks worked	Per cent of dentists	Mean number of patients in 1949
1–9	0.3	55
10–19	1.0	131
20–29	1.1	294
30–39	3.0	688
40–43	7.6	873
44	4.2	926
45	5.5	914
46	9.1	970
47	8.6	1,005
48	20.9	1,030
49	12.2	1,032
50	18.9	912
51	3.4	864
52	4.2	768
All dentists	100.0	933

Table 32 • Percentage distribution of dentists by number of weeks in 1949 not spent in dental office

Number of weeks	Percentage of dentists spending indicated number of weeks	
	On vacation	In other activities*
0	8.8	48.8
1	8.8	16.5
2	31.4	15.2
3	15.8	5.2
4	16.8	4.4
5–9	16.1	4.7
10–14	1.9	1.9
15 and over	0.4	3.3
	100.0	100.0

*Other activities than working in dental office or on vacation include sickness, other vocational activity and so forth.

When number of weeks worked is broken down by age groups, it is shown that dentists over 70 years of age averaged about two weeks less in their dental offices than did dentists aged 30 to 50 (Table 30). The marked difference between the mean (45.2) and the median (49) for dentists under 30 is probably caused by graduating dentists who entered practice late in the year. The median of 49 is higher than medians for the other age groups, suggesting that dentists in that age group worked the largest number of weeks, except for the new dentists.

Table 33 • Average number of patients in 1949 by age of dentist

Age of dentist	Number of patients	
	Mean	Median
–29	697	479
30–39	889	588
40–49	1,022	765
50–59	980	718
60–69	939	607
70–	697	474
All ages	933	634

Table 34 • Distribution of dentists by number of patients in 1949

Number of patients	Per cent of dentists	Cumulative per cent
–99	2.9	2.9
100–199	7.3	10.2
200–299	9.4	19.6
300–399	8.9	28.5
400–499	8.3	36.8
500–599	9.1	45.9
600–699	6.1	52.0
700–799	4.0	56.0
800–899	5.3	61.3
900–999	3.6	64.9
1,000–1,099	5.6	70.5
1,100–1,199	1.8	72.3
1,200–1,299	4.4	76.7
1,300–1,399	1.7	78.4
1,400–1,499	1.2	79.6
1,500–1,599	4.4	84.0
1,600–1,999	4.0	88.0
2,000–2,399	4.2	92.2
2,400–2,799	3.6	95.8
2,800–3,199	1.7	97.5
3,200–	2.5	100.0

Two weeks was easily the most popular length of vacation with 31.4 per cent of the respondents (Table 32). About one out of every 11 dentists (8.8 per cent) did not take a vacation in 1949, and an equal number spent but one week on vacation. About one out of six respondents (15.8 per cent) had three weeks of vacation and approximately the same proportion (16.8 per cent) had four weeks of vacation. Almost half (48.8 per cent) reported no weeks spent in activity other than dental work and vacation, and the majority of the remainder spent only one or two weeks in other activities.

NUMBER OF PATIENTS DURING 1949

The mean number of patients reported for the year 1949 was 933 and the median was 634 (Table 33). The large difference between the mean and the median results from a comparatively small number of dentists reporting a very large number of patients. It is possible that these dentists misunderstood the question and recorded number of sittings rather than number of different patients as requested. The question was a difficult

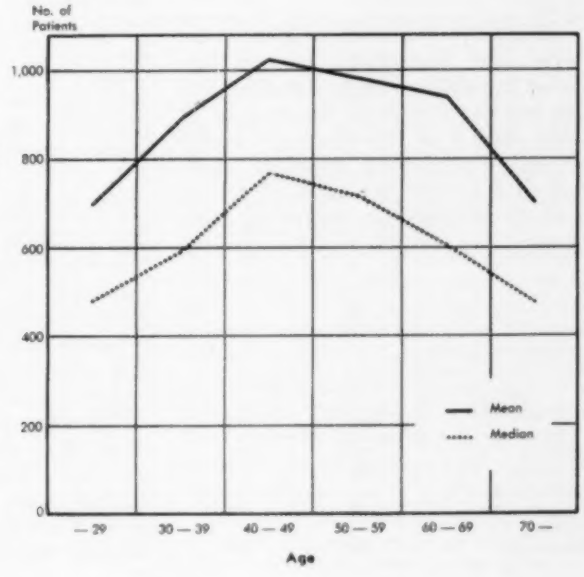

Fig. 7 • Average number of patients in 1949 by age of dentist

Table 35 • Average number of patients in 1949 by practice classification

Classification of practice	Number of patients	
	Mean	Median
General practitioner	942	658
Specialist	807	440
Oral surgeon	1,695	1,512
Orthodontist	276	172
Pedodontist	930	812
Periodontist*	....	....
Prosthodontist*	....	....

*Too few periodontists and prosthodontists answered this question for reliable results.

one for dentists to answer correctly, and it is likely that some dentists counted the number of patients during a typical week or month and multiplied to obtain the number during the year. This is an invalid procedure because some patients during the counted period return during subsequent periods. Some dentists may have counted all patients "on the books" whether or not they received dental services during the year. That this was not a common practice is indicated by Table 33, which shows a definite decline in number of patients of dentists beyond the age of 50.

An attempt was made to identify the "extremists" statistically. On the suspicion that dentists employing other dentists may have counted the patients of other dentists in the office, the figures of these dentists were separated. However, this lowered the mean of the remainder (dentists not employing other dentists) only to 917. Oral surgeons reported a large number of patients, but removing them likewise reduced the mean only to 916. Questionnaires of dentists reporting large numbers of patients were examined subjectively with the hope of finding an identifying characteristic of this group, but to no avail. Some of the total variation is explained in paragraphs to follow, but it was impossible to identify the small group of dentists who reported extremely large numbers of patients.

Table 34 shows the wide variation in number of patients during the year. Ten per cent of all respondents reported fewer than 195 patients and 10 per cent reported more than 2,000 patients. An examination of the ungrouped frequency distribution revealed a marked tendency to answer in round numbers, indicating that many of the answers were estimates rather than actual counts.

The mean number of patients in 1949 reported by dentists under 30 years of age (697) was the same as the mean number reported by dentists 70 and over (Table 33 and Figure 7). Dentists in their forties reported more patients

Table 36 • Average number of patients in 1949 by type of private practice

Type of practice	Number of patients	
	Mean	Median
Individual	932	638
Partnership	1,145	708
Associated in group practice	1,084	775
Employed by other dentist	715	408

Table 37 • Average number of patients in 1949 by population of city or town and for the five largest cities

Population	Number of patients	
	Mean	Median
Under 1,000	1,073	900
1,000–2,499	1,233	1,011
2,500–4,999	1,217	1,050
5,000–9,999	1,243	991
10,000–24,999	1,093	833
25,000–49,999	969	706
50,000–99,999	911	618
100,000–249,999	905	615
250,000–499,999	870	596
500,000 and over	633	406
City		
New York	451	288
Chicago	561	382
Philadelphia	556	382
Los Angeles	920	588
Detroit	732	505

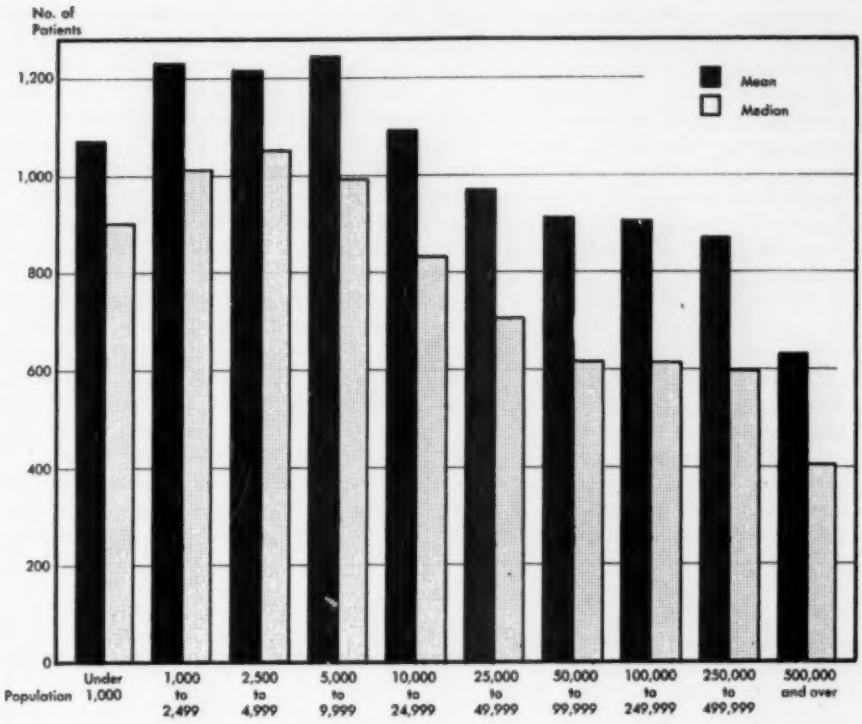

Fig. 8 • Average number of patients in 1949 by population of city or town in the United States

than dentists in any other age group, although those in their fifties (980) and sixties (939) were also above the grand mean in this respect.

Specialists reported significantly fewer patients during the year than did general practitioners (Table 35). Among specialists, oral surgeons had by far the greatest number of patients, with a mean of 1,695. Orthodontists reported seeing only 276 different patients during the year. This great difference may be accounted for by the fact that oral surgeons often see referral patients but once, while orthodontic patients return repeatedly during a year's time.

Dentists in partnership reported a mean of 1,145 patients during the year (Table 36), more than 200 above the mean for all dentists. The mean for those dentists associated in group practice was 1,084. Dentists employed by other dentists had considerably fewer patients (715) than other private practitioners.

When classified by number of weeks in the dental office, dentists working 47 to 49 weeks had the most patients. Dentists who worked 50 to 52 weeks during the year had fewer patients than dentists who worked between 44 and 49 weeks (Table 31). Possibly the explanation for this is that the less prosperous dentists—those with fewer patients—felt unable to take a vacation.

In general, dentists in smaller towns averaged a greater number of patients

than dentists in the larger cities (Table 37 and Figures 8 and 9). All five size-of-place classifications under 25,000 population had means of over 1,000 patients, while larger population categories all had smaller means. In terms of the median, the disparity between large and small places was even greater. This disparity is contrary to what one would expect from the fact that in large cities more persons would be counted as the patients of two or more dentists within the span of a year.

The mean number of patients for members of the Association was 937, and for nonmembers it was 853. The medians were respectively 644 and 488.

Dentists were asked to estimate the percentage of their 1949 patients who returned for all recommended dental care (Table 38). More than one third (35.1 per cent) of the respondents estimated that 90 per cent or more of their patients received all recommended care, and over two thirds (69.2 per cent) replied that over 70 per cent had all work completed. The median was 80 per cent.

Multiplying the mean of 933 patients by the estimated total of 76,000 practicing dentists in the United States, an estimate of 71 million persons is arrived at as the number seeing a dentist in 1949. However, this number must be decreased by the number seeing more than one dentist. And, as pointed out previously, the mean of 933 appears suspiciously high. It seems safe to say that 71 million dental patients in 1949 is a maximum—that the true number lies somewhat below that figure. If the error is 11 million and 60 million different persons saw the dentist in 1949, it may be said that approxi-

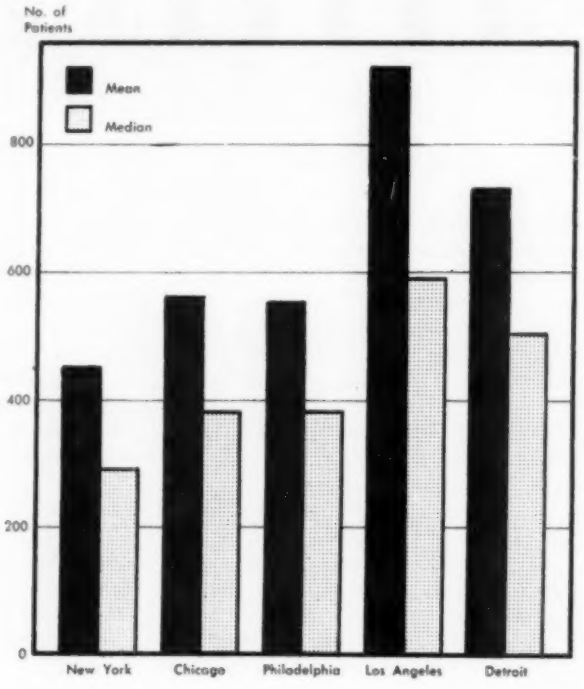

Fig. 9 • Average number of patients in 1949 for the five largest cities in the United States

Table 38 • Percentage distribution of dentists by per cent of 1949 patients estimated to have returned to receive all recommended dental care

Per cent of patients receiving all recommended dental care	Per cent of dentists	Cumulative per cent
1–9	0.7	100.0
10–19	2.3	99.3
20–29	5.0	97.0
30–39	2.7	92.0
40–49	3.4	89.3
50–59	9.5	85.9
60–69	7.2	76.4
70–79	17.5	69.2
80–89	16.6	51.7
90–99	33.0	35.1
100	2.1	2.1

mately 40 per cent of the population saw the dentist during the year. If the 16 million children under five years of age are excluded (only 1.7 per cent of dental patients reported in the survey were under five), 45 per cent of the remainder received dental care within the year.

The next article in this series will present statistics on dental patients reported in the survey.

B. Duane Moen, Assistant Director

Leslie M. FitzGerald, Chairman
Advisory Committee

Relocation of dentists during 1948 and 1949

It is generally accepted that a dentist's established practice tends to deter him from relocating. Nevertheless, during 1948 and 1949 more than 3,700 dentists either moved from one state to another or transferred in or out of the federal government dental services (Table 1).

More dentists moved out of New York (313) than out of any other state, although California (355) exceeded New York (229) in number of dentists moving in. The greatest net gain through relocation occurred in California (151), while the greatest net loss was in Illinois (130) (Table 2). When net change through relocation is considered as a percentage of all dentists in the state at the beginning of the period, the proportionately largest gain thus incurred was in New Mexico, followed in order by Arizona, Nevada and California. The proportionately largest loss through relocation occurred in Nebraska, followed by Wyoming, Kentucky, Iowa, Oklahoma, Illinois and Missouri.

Dentists have tended to concentrate in areas of high per capita income (Table 2). When states are ranked (1) by per capita income in 1948 and (2) by ratio of dentists to population in 1948, it is found that a very high rank-order correlation of plus 0.77 exists. Otherwise expressed, the 10 states with the most favorable dentist-population ratio had a per capita income of $1,694 while the 10 states with the most unfavorable ratio had a per capita income of $979. Obviously, there is a greater demand for dental services in high-income states and therefore these need more dentists than low-income states.

However, there is evidence that dentists have concentrated in areas of high per capita income too much for their own economic well being. Statistically reliable figures on incomes of dentists are available for 23 states from the Department of Commerce survey made in 1949.[1] Among these states, a rank-order correlation of minus 0.39 existed between per capita income and mean income of den-

1. Survey of Current Business. U. S. Department of Commerce, 1950, pp. 8-16.

Table 1 • Relocation of dentists during 1948 and 1949

Moved From \ Moved To	Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi
Alabama			1						4														
Arizona				12					1			2	1	2							1		
Arkansas				1						1													
California		9	2		2	1		1	2	1	1	11			3			1	1	2	3	4	
Colorado		1		6				1	1		1	3			2							1	
Connecticut				3					7					1						2	1		
Delaware				1																			
Dist. of Columbia				1	1	2			9			1							11			2	
Florida	2			2		3		2		4		6		1			3	1		4	3		
Georgia	1	1				1			9							1					2		1
Idaho				5											1								
Illinois		5	2	42	6	2		1	14	2	1		6	2	4	1		1	1	2	3	4	1
Indiana		1		10		1			9			2				3	1				3	2	
Iowa		2		7		1			2		1	4			1					1	2	2	
Kansas				2	6				1		1	1							1	2			
Kentucky				2					1			1	2				1				2		
Louisiana	1			1					1		1	2		1								2	5
Maine									2						1				1				
Maryland						1		10		1			2										
Massachusetts	3		1	6		2		3	6	1		1	1				1	7	1			1	
Michigan		2		15	1			1	8	2		3	3	2			2		1				
Minnesota		1		17	1			2			1	2	3	2					1		2		
Mississippi					1												1						
Missouri		3	2	14	3	1		1	3			18	1	1	11		1		1	1	1		
Montana				3																			
Nebraska			1	8	9							1		3	1	1				1			
Nevada				1																			
New Hampshire				1				1	3									1		3			
New Jersey		2		2		1		1	13					1	1			1	1	2	1		
New Mexico				1								1											
New York		1		24	3	23		5	19			4	2					3	7	14	4	1	
North Carolina								1	7	2				1					2			1	
North Dakota		1		2								1										4	
Ohio	1			12		1			11	1		3				3				2		2	
Oklahoma	1	2	1	3					2		1			3	3						1		
Oregon		1		10							1		1								1		
Pennsylvania		3	1	8		3		4	13	4		4	2		1		2			3	5	1	
Rhode Island						2												1		2			
South Carolina									1	1		1				1			1				
South Dakota			1	2								1								1		1	
Tennessee	5	1		2				1	4	2		2					1		1		2		2
Texas	1		1	2						1		1		1			3		1	1	3	1	1
Utah		1		15							2										1		
Vermont																			1	2			
Virginia	1	1						6	1			2							1		3		
Washington		1		18	1						2		2		1					1	1		
West Virginia				2				1	3			1				1							
Wisconsin	1	4	1	9	2			1	3		1	11	1	2			1			1	2	5	1
Wyoming		1		1																	1		
Federal Services*	5	5	5	78	14	14	1	12	20	11	4	49	20	5	6	13	9	3	14	25	29	32	2
Other†	1			4	1					1		1	2						2		2	1	
Total	23	49	19	355	51	59	1	55	180	35	18	140	49	28	36	24	26	19	52	72	79	65	13

*Federal services are—Army, Navy, Air Force, U. S. Public Health Service and Veterans Administration.

†Other includes Alaska, Canal Zone, Hawaii, Puerto Rico, Marianas Islands, Guam, Virgin Islands and foreign countries.

Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Federal Services*	Other†	Total
1							3																			6		15
1												1	1													6		28
2											1						1									6		12
3		2	3		1	4	5		2	1		6	3				2	6	11			8		3		96	4	204
		1	1			1	1	1		1	1	1					1					1				13	1	40
			1		1		6						1	2												12	1	38
													1													1		3
1							3	1		1			1								7			1		14	1	57
1		1		2	6		13	5		3	1		3				3	1		1	1					16		88
								1								3		1			1					19		41
		1							1			1						1				1				3		14
5	4	3		1	1	2	6		3	5		5	2	1		2	3	4			4	5	1	14	1	96	2	270
							4	1					2				1	2			2					21	1	66
1		2								2	1				1	2		1	1		1	4	1			24	2	66
9		1									2	1										2			1	15		45
1		1								6					1		3	3			1		2			16	2	45
						2		1							1			4								19		41
							2	1					1													4		12
1					1	2		1					4		1						2					22	1	49
				10	4	1	13	1				1	3	3			1			1		1		1		27		101
5		1					4			4			2				1				1	6	1	4	1	27	1	98
		2					2		2				1			3	1	1	1		2	9		5		27	2	90
														1	1		2	1								7		14
			1			2	3	2			9		1			1	2	3	1				1		1	43		132
												2										3				2		10
	2						1		1	1						4	1	1				4			1	17		58
						1																						2
							2													1		1				1		14
2				1			27					1	7											1		38	1	104
	1										1							1								2		7
3				1	32			2		4		2	16	1	2		3	7		2	5	3		1		115	4	313
1							1						1				1	1			7			1		11	2	40
	1																					1		2		3		15
							3	1				1	2	1						1	1	1	2	4	1	36	2	92
1						3												7				2		1		16		47
	1										1		1				1	1	3			16				7	2	47
3					15	1	10	1		6					2			2			4		1	1		78	1	179
							3			1																9		18
							1		1				1				1									5		14
1		1					1																			1		10
1						1	2			1	1							3						1		14	1	48
2		2				2	4			3	8	1	1				2				1	3				42	2	90
			1									1										1		1		2		25
							1															1				2		7
						1	4	3										1								24		48
	3	1							1			7	2				1		1					1		27	3	74
					1					2											1					6		18
3	1						4	2	1	1		1					1	1			1					33	1	96
1										1		1														3	1	10
30	1	5		3	15	1	97	10	2	20	3	7	34	4	2		10	23	7		10	11	7	18		50	6	752
							3					1	1											2		9		31
79	14	24	7	18	77	24	229	34	14	63	29	41	92	13	14	12	42	76	25	6	52	84	16	62	6	1093	44	3738

Source: Supplements to the American Dental Directory, April 1948 through March 1950.

Table 2 • States ranked by per capita income and by ratio of dentists to population in 1948, and change in number of dentists through relocation in 1948 and 1949

State	Rank in per capita income, 1948	Rank in ratio of dentists to population, 1948	Net change in number of dentists through relocation, 1948-49	Rank in net change through relocation considered as percentage of total dentists in state*
Alabama	46	46	+ 8	12
Arizona	35	39	+ 21	2
Arkansas	48	47	+ 7	6
California	8	9	+151	4
Colorado	23	14	+ 11	10
Connecticut	5	7	+ 21	9
Delaware	4	32	− 2	42
Dist. of Columbia	6	2	− 2	21
Florida	37	28	+ 92	13
Georgia	42	44	− 6	31
Idaho	30	33	+ 4	7
Illinois	2	6	−130	44
Indiana	24	24	− 17	34
Iowa	16	15	− 38	46
Kansas	28	22	− 9	36
Kentucky	45	40	− 21	47
Louisiana	41	35	− 15	41
Maine	33	29	+ 7	5
Maryland	13	34	+ 3	17
Massachusetts	14	5	− 29	33
Michigan	17	21	− 19	25
Minnesota	26	3	− 25	38
Mississippi	49	48	− 1	20
Missouri	25	12	− 53	43
Montana	3	18	+ 4	11
Nebraska	19	8	− 34	49
Nevada	7	20	+ 5	3
New Hampshire	29	25	+ 4	8
New Jersey	9	11	− 27	35
New Mexico	39	43	+ 17	1
New York	1	1	− 84	28
North Carolina	44	45	− 6	29
North Dakota	18	30	− 1	23
Ohio	12	23	− 29	32
Oklahoma	40	37	− 18	45
Oregon	27	10	− 6	24
Pennsylvania	21	17	− 87	39
Rhode Island	11	13	− 5	37
South Carolina	47	49	0	18
South Dakota	10	26	+ 2	15
Tennessee	43	41	− 6	27
Texas	34	42	− 14	30
Utah	31	19	0	19
Vermont	32	31	− 1	26
Virginia	36	38	+ 4	16
Washington	20	16	+ 10	14
West Virginia	38	36	− 2	22
Wisconsin	22	4	− 34	40
Wyoming	15	27	− 4	48

*The state with greatest proportionate net gain resulting from relocation is ranked 1 and the state with greatest proportionate loss is ranked 49.

tists (dentists in states with high per capita income actually had lower incomes than dentists in states with low per capita income).

The figures for 1948 and 1949 indicate that dentists who are relocating are recognizing their over-concentration in high-income areas and are tending to some extent to correct it. Measured by rank-order correlation, a positive relationship existed between need for dentists and proportionate net change in number of dentists resulting from relocation during 1948 and 1949. The population per dentist in those states having a net gain in dentists through relocation was 1,951 in 1948 while in those states having a net loss it was 1,676. A negative correlation existed between per capita income and proportionate net change through relocation. The per capita income in those states having a net gain in dentists through relocation was $1,384 in 1948 while in those states having a net loss it was $1,429. In other words, dentists who relocated tended to move to areas most in need of dentists rather than to high-income areas.

B. Duane Moen, Assistant Director

Book Reviews

ATOMIC ATTACK: A MANUAL FOR SURVIVAL

By John L. Balderston, Jr., and Gordon W. Hewes. 55 pages. Illustrations. Price $1.00. Culver City, Cal.: Murray and Gee, 1950.

This small manual, whose publication is sponsored by the Council on Atomic Implications at the University of Southern California, will be of use not only to defense organizations and disaster committees, but to individuals as well. It describes in clear, concise terms what to do in case of an atomic attack, and gives the reasons why certain protective measures must be taken. A section illustrated with sketches, gives directions for making a room reasonably atom-bomb proof.

One of the authors, John L. Balderston, Jr., was physicist-engineer at Oak Ridge, Tennessee, from 1943 to 1947, then assistant director of the Association of Scientists for Atomic Education, and is presently a radio-isotope research consultant in Los Angeles. Gordon W. Hewes was analyzer of Japanese target cities for the 20th Air Force in World War II, and is at present with the University of Southern California.

The manual is distributed by the Culver Products Company, Culver City, California.

Geraldine Udell

INTERNAL MEDICINE IN DENTAL PRACTICE

By Bernard I. Comroe, M.D.; Leon H. Collins, Jr., M.D., and Martin P. Crane, M.D. Third edition, revised. 81 illustrations and 6 color plates. 536 pages, with index. Price $6.50. Philadelphia: Lea and Febiger, 1949.

The authors in this third edition of *Internal Medicine in Dental Practice* have brought to the dental student and to the practicing dentist a clear description of the medicodental problems now considered essential knowledge for the progressive dental practitioner. Dentistry, as a health service, must of necessity be closely associated with that of medicine, and the physician in turn should understand many of the problems of dental practice in order that he may with wisdom guide those who consult him.

Chapter I, dealing with "Diseases of the Heart and Blood Vessels" is well written and gives a clear understanding of what occurs when these organs are diseased. The second part of this chapter dealing with cardiovascular disease in relation to dentistry is a most practical guide to the dentist.

Both local and general anesthesia are part of dental practice, and the authors rightfully point to the danger of hypertension as a cause of sudden death. This part of the chapter should be of particular interest to the dentist who might with wisdom seek medical consultation in such cases before proceeding to administer either local or general anesthesia, The modern dentist should consider the use of a sphygmomanometer as a necessary instrument in evaluating anesthetic risks.

The chapter on "Diseases of the Heart" also points out the risks attending dental extractions in patients suffering from rheumatic heart disease and explains prophylactic measures to be followed in the care of these patients.

The chapter dealing with "Diseases of the Respiratory Tract" is of interest to dentists, from the standpoint of the dentist protecting himself, as well as protecting his patient. With the advent of the air abrasive technic for cavity preparation, dentists must recognize that inhalation of the material used may result in producing pulmonary lesions.

Chapter VII, on "Diseases of the Blood and Blood-Forming Organs," is of particular interest to the dentist. The text on the anemias and leukemias is excellent.

Chapter XI has much of interest to the dentist in the description of allergic disturbances, deficiency diseases and vitamins. These are problems frequently encountered in dental practice.

The dentist should find the chapter on "Foci of Infection" extremely instructive, especially that part covering "Bacteremia Following Dental Extractions."

Chapters XIV and XV, concerned with the "Sulfonamides" and "Antibiotics," will give the practicing dentist a real working knowledge of drugs commonly used in dentistry and often poorly understood.

The book as a whole is an excellent comprehensive text deserving of careful reading and use as a reference work by dentists desirous of knowledge that will aid them to understand more fully many of the medicodental problems constantly presenting in everyday dental practice.

James R. Cameron

Current Literature

ULCERATION OF THE MOUTH IN CHILDREN

J. L. Henderson. The Practitioner. 164: 149. February, 1950.

Ulceration of the oral tissues is common in childhood. Infections are listed as the principal cause, although there are many etiologic factors, some of which are rather obscure.

Many systemic diseases are accompanied by oral manifestations in the form of ulcers. Trauma may be considered as dominant among the local factors.

Thirty-one causes of ulceration are listed and discussed rather briefly. The symptomatology, pathology and treatment are important considerations.

Donovan W. Brown

MINIMIZING THE NEED FOR MECHANIZED ORTHODONTIC THERAPY

R. C. Willett. Am. J. Orthodon. 35:913, December, 1949.

Brief summaries of the treatment of five cases accompany photographs of plaster models which show results obtained through combining usual orthodontic procedures with carefully prescribed exercises. The author emphasizes the value of retraining the habitual activity of the muscles of mastication and deglutition. Appropriate tribute is paid to Alfred Paul Rogers for his contributions to the development and advance of myofunctional therapeutic procedures. The need for faithful cooperation on the part of the patient in carrying out the prescribed exercises is also stressed.

T. D. Speidel

JOURNAL OF DENTAL RESEARCH

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*DOES GLUCOASCORBIC ACID PRODUCE SCURVY? *Robert J. Gorlin, New York, p. 208*

DENTAL CHANGES IN RATS ON A PURIFIED DIET DEFICIENT IN VITAMIN E, *Jens Jorgan Pindborg, Copenhagen, Denmark, p. 212*

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CHANGES IN THE KALLIKREIN CONTENTS OF SALIVA UNDER PHYSIOLOGICAL CIRCUMSTANCES AND IN PERIODONTOCLASIA, *Cornelia Sallay and Charles Nador, Budapest, Hungary, p. 232*

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EVALUATION OF DISINFECTANTS BY TESTS IN VIVO

Marjorie Pierce Prombo and Evelyn B. Tilden

Three bacteria were used as test organisms, *Strp. pyogenes, D.pneumoniae* and *Myco. tuberculosis,* and the killing power of the various disinfectants varied strikingly with the different bacteria. Iodine and saponated cresol were almost completely effective against all three; 3 per cent formaldehyde (Tainter et al) and 1 per cent tincture of DC 12 (a quaternary ammonium comp.) killed both pneumococcus and the tubercle bacillus and were reasonably active against the hemolytic streptococcus, but aqueous DC 12 did not kill the tubercle bacillus. Zephiran behaved similarly against the pyogenic cocci. The two quaternaries must be used in 1 per cent concentration, and compositions of this type are not necessarily bactericidal, since Radiol (cetyldimethylethylammonium bromide) appeared to be inactive in the concentration recommended by the makers. Phenol and orthophenyl phenol failed in the case of the streptococcus, though active against the tubercle bacillus. Although the latter is regarded as harder to kill than the coccus, it is noted that a solution of 2 parts of saponated cresol in 100 parts of water was sufficient to kill the tubercle bacillus, while 5 parts to 100 were needed for the pneumococcus. It is suggested that a safe choice for disinfection of dental instruments would be 5 per cent saponated cresol or the 3 per cent formaldehyde of Tainter et al. A 1 per cent tincture of DC 12 would be nearly as good, though not quite so effective against the hemolytic streptococcus, while Metaphen Disinfecting Solution, which contains benzyl alcohol, is satisfactory for the hemolytic streptococcus. Aqueous solutions of Metaphen or Merthiolate should not be relied upon, and orthophenyl phenol is questionable, because of its lack of ability to kill the hemolytic streptococcus, although it is effective against the other two bacteria.

PHYSIOLOGICAL TOOTH MIGRATION AND ITS SIGNIFICANCE IN THE DEVELOPMENT OF OCCLUSION. I. THE BIOGENETIC COURSE OF THE DECIDUOUS DENTITION

Louis J. Baume

A study of the developmental changes of the deciduous dentition was made of 30 children from 3 to 5½ years of age by means of plaster reproductions. Serial measurements and examination showed that after the deciduous arches were fully formed their sagittal and transversal dimensions (measured from points not affected by attrition) were not altered except when subjected to inadequate environmental influences. Two morphological arch forms were observed; the deciduous dental arches were either continuously spaced or continuously closed. Closed arches were on an average narrower transversally than spaced ones. The interproximal spaces were not developmental but congenital. The spaced arches frequently showed two distinct diastemata; one between the mandibular deciduous cuspid and first deciduous molar and the other between the maxillary deciduous second incisor and deciduous cuspid; they were called "primate spaces." The terminal plane of the arches in occlusion constantly remained straight in 80 per cent and in 15 per cent formed a mesial step. None of the observations made in this study could corroborate the concept of physiologic changes of the deciduous dental arches through spacing and mesial shifting of the mandibular teeth.

VERTICAL FORCES USED DURING CHEWING OF FOOD

A. H. Howell and Finn Brudevold

Variable inductance type strain gages were inserted under each of two bicuspids and the first molar of an upper denture, the gages being connected to associated electronic equipment and a strip chart recorder by means of thin wires. The chewing forces were recorded as deflections on a strip chart, and measurements could be taken without interfering with normal, comfortable chewing. Preliminary tests, which included mastication of brittle

and tough foods, indicated that the range of force which a denture wearer uses during mastication is small.

PRELIMINARY REPORT IN THE USE OF XYLOCAINE AS A LOCAL ANESTHETIC IN DENTISTRY

Loren W. Gruber

A new anesthetic was discovered in 1943 by Lundquist and Lofgren, Swedish chemists, as a result of a series of experiments with basic anilids which are widely different in structure from the procaine-cocaine group. The toxological and pharmacological investigations follow herewith: Xylocaine, being a mild vasoconstrictor in the first place, requires little epinephrine addition. Its toxicity is nil. The chief advantages are speed of action, smoothness and profundity of anesthesia. There seems to be a slight tendency for paresthesia of the mucous membranes, but not complete. Anesthesia is complete for peritoneum as a topical anesthesia. Xylocaine is indicated as a local anesthetic with greater safety, greater speed and greater profundity wherever procaine can be used as an injection.

COMPARISON OF GOLD ALLOY AND STAINLESS STEEL WIRE FOR ORTHODONTIC ARCHES AND SPRINGS

R. C. Angell

Tensile vs. bending characteristics of typical gold and steel wires are compared. If tensile properties are analyzed in determining usefulness in bending, wrong conclusions may be reached. Effects of moduli of elasticity on wire size are discussed. Soldering steel wires reduces usefulness. Gold alloy for orthodontic springs is superior to stainless steel.

STUDIES ON THE INCIDENCE AND CAUSE OF DENTAL DEFECTS IN CHILDREN. VIII. THE DECIDUOUS MOLARS: CARIES INCIDENCE

Marcu Brucker

This study concerns itself with the incidence of caries of the deciduous molars in a group of 2,211 white and Negro children of both sexes. The white girls showed a higher percentage of carious first and second deciduous molars than the white boys. In the case of the Negro children the reverse was demonstrated with the caries incidence higher in the boys. In general the Negro children (male and female) showed a lesser susceptibility to caries of these teeth. It was learned that in both white and Negro children the lower deciduous molars were more frequently attacked by caries than their upper antagonists.

Social status seemed to play no part in caries resistance as children of better economic strata showed a higher incidence of carious molars. The relation of sex and race to caries occurrence appeared a tangled problem.

THE DISTRIBUTION OF CARIOUS ACTIVITIES IN THE LOWER MOLARS OF CARIES-SUSCEPTIBLE AND CARIES-RESISTANT ALBINO RATS (RATTUS NORVEGICUS)

H. R. Hunt and C. A. Hoppert

Since 1937 the authors have been investigating the role of heredity in dental caries of albino rats. In addition, a number of nonhereditary factors have been studied. A caries-susceptible and a caries-resistant strain have been produced. The cariogenic diet used has been the ground rice-powdered milk-alfalfa meal-salt diet developed by Hoppert and his collaborators. The present paper does not attempt to demonstrate newly discovered causes of dental caries, but to describe the distribution of cavities in the lower molar teeth. In the susceptible strain, 6,269 cavities have been tabulated; in the resistant strain, 3,779 cavities. The highest incidences of cavities in the susceptibles were near the centers of the occlusal surfaces of the first (21.7 per cent) and second (38.7 per cent) lower molars. There were significantly more cavities on the right jaw (57.81 per cent) than on the left (42.19 per cent). The highest incidences in the lower molars of the resistant rats were on the occlusal surface of the posterior region of the first molar (22.8 per cent), at the contact between the first and second molars (22.5 per cent), and the occlusal surface of the posterior region of the second molar (21.9 per cent). Here, too, there were significantly more cavities on the right side (52.18 per cent) than on the left (47.82 per cent.)

CORRELATION OF SALIVA ANALYSES WITH DENTAL EXAMINATIONS OF 574 FRESHMAN AT OREGON STATE COLLEGE

June H. Sullivan and Clara A. Storvick

The results of five salivary analyses: pH, starch hydrolyzing time, buffer capacity, ammonia nitrogen, and lactobacillus plate counts, were correlated with clinical findings as expressed by DMF surfaces. Highly significant

correlation coefficients were found between DMFS and starch hydrolyzing time, and between DMFS and lactobacillus plate counts. The positive correlation between DMFS and pH and the inverse correlation between DMFS and buffer capacity were significant. No correlation was found between DMFS and ammonia nitrogen.

Intercorrelations among the analyses were calculated, using each of ten possible combinations. The positive correlation between pH and buffer capacity was highly significant. The inverse correlation between lactobacillus counts and buffer capacity, and the positive correlations between buffer capacity and starch hydrolyzing time and between ammonia nitrogen and pH all were significant. None of the other combinations gave significant correlations.

STATISTICAL INTERPRETATION OF SALIVARY ANALYSIS ON 555 SCHOOL CHILDREN IN TWO GEOGRAPHIC REGIONS IN OREGON

June H. Sullivan and Clara A. Storvick

Salivary analyses were made on native-born and native-reared children in two regions, Coast and Central, in Oregon. Significant variations were found between counties in pH, buffer capacity, ammonia nitrogen, and lactobacillus counts. There was also a consistent significant variation in buffer capacity between the sexes.

Significant positive correlations were found between lactobacillus counts and the Snyder test and between pH and buffer capacity. Significant negative correlations were found between lactobacillus counts and ammonia nitrogen, and between ammonia nitrogen and the Snyder test.

EFFECT OF ZINC CHLORIDE AND POTASSIUM FERROCYANIDE ON PROTEOLYSIS

James L. Dannenberg and B. G. Bibby

To indicate whether treatment of teeth with zinc chloride and potassium ferrocyanide would reduce dental decay by preventing proteolysis of the organic structures of the teeth, the effect of these agents was tested on trypsin and pepsin digestion of egg albumin, whole dentin and decalcified dentin. It was found that proteolysis of egg albumin in Mett tubes was enhanced by these agents. Normal dentin was not affected and decalcified dentin was digested to the same extent with or without treatment with zinc chloride and potassium ferrocyanide. It was concluded that if any caries reduction is brought about by these agents it is probably the result of factors other than interference with proteolysis of dental tissues.

EFFECT OF FLUORIDES AND OTHER COMPOUNDS ON THE SOLUBILITY OF ENAMEL, DENTIN, AND TRICALCIUM PHOSPHATE IN DILUTE ACIDS

Joseph C. Muhler, Thomas M. Boyd and Grant Van Huysen

Thirty-two reagents were appraised for their ability to reduce the solubility of enamel, dentin and tricalcium phosphate. The method of evaluation was by determination of normal unprotected solubility of the two tissues and tricalcium phosphate by decalcification with 0.2N CH_3COOH and comparing this data with that obtained by treating protected (protected with reagent solution) enamel, dentin, and tricalcium phosphate with similar aliquots of 0.2N CH_3COOH.

Results indicate that enamel is most resistant to decalcification with dentin and tricalcium phosphate following in the order listed. Various reagents not containing fluorine have the ability to reduce the solubility of enamel, dentin, and tricalcium phosphate. The most satisfactory reagent used to decrease the solubility of enamel, dentin, and tricalcium phosphate in vitro is stannous fluoride.

OBSERVATIONS ON EXPERIMENTAL DENTAL CARIES. X. DIFFERENCE OF SEX IN CARIES SUSCEPTIBILITY?

Humberto Granados, Johs. Glavind and Henrik Dam

The difference of sex in caries susceptibility of the golden hamster was studied in two groups of litter-mate, newly weaned animals, which were reared for a 100-day experimental period on the cariogenic diet. Group I was composed of 32 males and group II was formed by 32 females. The results, which confirmed our previous observations on this subject, showed that there was no difference of sex in caries susceptibility since males and females exhibited the same caries activity. These results are at variance with what most North American workers have observed; that is, that males are usually more caries-susceptible than female hamsters. The possibility that these contradictory findings may be explained through the existence of strain differences with respect to sex-specific differences in caries susceptibility of the hamster has been pointed out.

THE POSTNATAL DEVELOPMENT OF THE MOLAR TEETH IN THE COTTON RAT

James H. Shaw, Nancy M. Shaffer and L. W. Soldan, Jr.

The rates of postnatal development and eruption for the molar teeth of cotton rats (*Sigmondon hispidus hispidus*) maintained on a stock ration composed of natural foodstuffs were determined.

In addition, a survey was made on the effect of purified rations fed after weaning upon the time of eruption of the maxillary and mandibular third molars. The time of emergence into the oral cavity and the completion of eruption of the third molars were much later for cotton rats fed the purified rations than in those maintained after weaning on rations composed of natural foodstuffs.

DOES GLUCOASCORBIC ACID PRODUCE SCURVY?

Robert J. Gorlin

The feeding of a purified diet containing 5 per cent glucoascorbic acid to weanling mice produced anorexia, mild alopecia, diarrhea, and weight loss. A failure to produce the "scurvy-like state" described by Woolley and Krampitz confirms the findings of Follis. The histopathologic changes in the long bones and teeth were not compatible with even initial scurvy, only increased vascularity of the marrow and pulp being noted.

THE EFFECT OF X-RAY IRRADIATION ON THE TEETH AND SUPPORTING STRUCTURES OF THE MOUSE

M. S. Burstone

Young mice of strain C57 black and Swiss were exposed to doses of 5,000, 3,000 and 1,500 roentgen units of radiation in the area between the external auditory meatus and the lower border of the mandible. A contact type x-ray machine was used under the following constant conditions: K.V. 50, M.A. 2, T.S.D. 20 mm., with no. 0 filter. The quality of radiation is relatively soft and thus the intensity diminishes greatly with the depth of the tissue. This means that the side of the jaw farthest from the radiation source receives a relatively small dose, thus serving as a comparative control.

With dosages of 5,000 r the cells in the ameloblastic layer may appear as low cuboidal or squamous type cells and there is a cessation of histodifferentiation of new ameloblasts. Fifteen hundred to 3,000 r produce less marked changes.

Doses of 1,500 to 5,000 r severely damage the odontoblastic layer. Surviving odontoblasts resemble osteoblasts in function and form an irregular amorphous, acidophilic-staining substance (osteodentin).

Odontoblasts are more radiosensitive than ameloblasts. There is a retardation or cessation of root formation following exposure to 1,500 to 5,000 r while development of the coronal dentin is only slightly altered.

COMPARATIVE STUDIES OF STREPTOMYCIN AND PENICILLIN IN THE TREATMENT OF INFECTIONS OF THE ORAL MUCOSA

S. Leonard Rosenthal and Gordon R. Winter

Aqueous solutions of penicillin (10,000 units per cc.) and streptomycin (100 mg. per cc.) were studied *in vitro*, in laboratory animals and in clinical use by topical application. Both are effective for control of the bacterial phases of acute Vincent's infection and pericoronitis. Streptomycin solution is more rapid in action and can be stored at room temperature for a longer time (7 days).

FURTHER STUDIES ON THE EFFECT OF HUMAN SALIVA ON THE CHOLERA VIBRIO IN VITRO

Clarence E. Dawson and Wilson Blagg

Saliva from cholera patients, malnourished individuals, and normal healthy subjects of comparative age and sex were collected by stimulative and nonstimulative methods. A series of filtrations through activated aluminum oxide adsorption columns separated the active and inactive portions. By spectrophotometry and plating methods the bacteriolytic and bacteriostatic action was differentiated. Organisms subjected to various tests were cholera vibrio, *Bact. paratyphosum A, B, C; Bact. coli communis, Shigella dysenteraie, Staph. aureus, Strp. alpha,* and *B. diphtheriae.* The salivary agents varied in their antibacterial specificity and exhibited bacteriolytic and bacteriostatic properties. Saliva filtrated from malnourished individuals and cholera patients revealed little or no antibacterial effect. The low salivary titer in these two groups may, when considered as an indicator of the antibacterial threshold of the other body secretions, offer a possible explanation as to why cholera and other diseases are limited to the malnourished class of people.

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Announcements

AMERICAN DENTAL ASSOCIATION

Ninety-First Annual Session	Oct. 30-Nov. 2, 1950	Atlantic City, N. J.
Ninety-Second Annual Session	Oct. 15-18, 1951	Washington, D. C.
Ninety-Third Annual Session	Sept. 8-11, 1952	St. Louis

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	April 16-18, 1951	Birmingham	G. W. Matthews	1922 Tenth Ave., S., Birmingham 5
Alaska			C. N. Hoveland	Anchorage
Arizona	April, 1951	Tucson	H. G. DeWolf	Valley National Bank Bldg., Tucson
Arkansas		Little Rock	D. M. Hamm	White Bldg., Clarksville
California	April 16-18, 1951	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	April 2-4, 1951	Los Angeles	C. A. Moss	1401 S. Hope St., Los Angeles
Colorado			R. A. Downs	724 Republic Bldg., Denver 2
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Jan. 10, 1951	Wilmington	L. Kreshtool	815 West St., Wilmington
District of Columbia	Mar. 11-14, 1951	Washington	K. H. Wood	202-1835 Eye St., N. W., Washington
Florida	Nov. 19-22	Hollywood	L. M. Schulstad	Professional Bldg., Bradenton
Georgia			J. M. Heard, Jr.	Persons Bldg., Macon
Hawaii			J. H. Dawe	810 N. Vineyard St., Honolulu 17
Idaho		Lewiston	A. R. Cutler	Eastman Bldg., Boise
Illinois	May 7-10, 1951	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 21-23, 1951	Indianapolis	E. E. Ewbank	Kingman
Iowa	May 7-9, 1951	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 6-9, 1951	Wichita	F. A. Richmond	Brotherhood Bldg., Kansas City
Kentucky	April 2-4, 1951	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	April 26-28, 1951	New Orleans	J. S. Bernhard	407 Medical Arts Bldg., Shreveport
Maine	June 28-30, 1951	Rockland	F. P. Gilley	31 Central St., Bangor
Maryland	April 30-May 2, 1951	Baltimore	E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore 1
Massachusetts	April 30-May 2, 1951	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	April 16-18, 1951	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Feb. 19-21, 1951	Minneapolis	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi	April 29-May 2, 1951	Jackson	H. M. Campbell	Tupelo
Missouri	April 1-4, 1951	St. Louis	R. R. Rhoades	201 Merchants Bank Bldg., Jefferson City
Montana	May 3-5, 1951	Billings	C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska	May 14-16, 1951	Lincoln	F. A. Pierson	Federal Security Bldg., Lincoln
Nevada	June 1, 2, 1951	Reno	W. R. Bell	Medical Arts Bldg., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey	April 11-13, 1951	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 21-23, 1951	Santa Fe	J. S. Eilar	First National Bank Bldg., Albuquerque
New York	May 7-11, 1951	Buffalo	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	April 30-May 2, 1951	Pinehurst	B. N. Walker	Liberty Life Bldg., Charlotte
North Dakota	May 17-20, 1951	Grand Forks	J. H. Lunday	Fargo
Ohio	Nov. 27-29	Cincinnati	E. G. Jones	185 E. State St., Columbus
Oklahoma	April 15-18, 1951	Oklahoma City	R. C. Calkin	109½ W. Oklahoma, Guthrie
Oregon		Portland	H. C. Fixott, Jr.	Medical-Dental Bldg., Portland
Panama Canal Zone			L. F. Baranowski	P. O. Box 102, Ft. Kobbe
Pennsylvania	Sept. 11-14, 1951	Pittsburgh	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico			J. F. Suarez	Box 3863, Santurce
Rhode Island	Jan. 1951	Providence	A. F. Sullivan	171 Westminster St., Providence 3
South Carolina	May 6-8, 1951	Charleston	J. R. Owings	201 E. North St., Greenville

State	Date	Place	Secretary	Address
South Dakota	May 20-22, 1951	Watertown	E. W. Elmen	Sioux Falls
Tennessee	May 7-9, 1951	Nashville	E. J. Justis	Exchange Bldg., Memphis
Texas	Apr. 30-May 3, 1951	San Antonio	W. Ogle	310 N. Ervay St., Dallas
Utah		Ogden	B. F. McBride	Medical Arts Bldg., Salt Lake City
Vermont	May 20-22, 1951	Woodstock	J. A. Larrow	Middlebury
Virginia	April 9-11, 1951	Richmond	J. E. John	804 Medical Arts Bldg., Roanoke
Washington			C. E. Flood	1130 Medical-Dental Bldg., Seattle 1
West Virginia	June 16-18, 1951	White Sulphur Springs	A. B. Drake	1202 West Virginia Bldg., Huntington
Wisconsin	Mar. 27-29, 1951	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming			T. J. Drew	State Capitol, Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 18, 1951	Birmingham	M. D. Edwards	120 Adams, Montgomery
Alaska	Aug. 6-11, 1951	Ketchikan	J. H. Geyer	Juneau
Arizona	Nov. 8-11		R. K. Trueblood	25 N. Second Ave., Glendale
Arkansas			H. E. Hanna	Wilson Bldg., El Dorado
California	Feb. 5, 1951	San Francisco	K. I. Nesbitt	507 Polk St., San Francisco 2
Colorado			W. D. McCarthy	724 Republic Bldg., Denver 2
Connecticut	Nov. 14-18*	Hartford	C. G. Brooks Recorder	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia	Jan. 8-12, 1951	Washington	W. M. Falls	1801 Eye St., N. W., Washington 6
Florida	July 9-14, 1951*		A. W. Kellner	P. O. Box 155, Hollywood
Georgia			R. C. Coleman	State Capitol Bldg., Atlanta 3
Hawaii			H. L. Houvener	7-8 Pantheon Bldg., Honolulu
Idaho			F. L. Luce	510 First National Bank Bldg., Boise
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana	Nov. 13-16*	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa	Dec. 4-8*	Iowa City	H. M. Willits	719 Roshek Bldg., Dubuque
Kansas			G. L. Teall	Hiawatha
Kentucky			R. I. Todd	Western Union Bldg., Richmond
Louisiana			A. R. deNux	Marksville
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	Nov. 13-15		W. D. Day	3811 Hadley Square E., Baltimore 18
Massachusetts			J. C. Wilson	413 N. State House, Boston 33
Michigan	Jan. 28-Feb. 2, 1951	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit 21
Minnesota	Jan. 8-12, 1951	Minneapolis	F. A. Larson	1632 Washington St., N. E., Minneapolis
Mississippi	Jan. 8-10, 1951	Jackson	J. C. Boswell	508 Lamar Bldg., Jackson
Missouri			R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			P. M. Feda	Box 865, Helena
Nebraska			C. A. Bumstead	924 Stewart Bldg., Lincoln
Nevada	Dec. 4	Reno	G. C. Steinmiller	Masonic Temple, Reno
New Hampshire	June, 1951	Boston	J. B. Brown	5 N. State St., Concord
New Jersey	Dec. 11-15††	Philadelphia	W. A. Wilson	150 E. State St., Trenton 8
	Dec. 11-15**	Trenton		
	Dec. 11, 12‡	Philadelphia		
New Mexico			J. J. Clarke, Sr.	Artesia
New York			D. W. Beier	23 S. Pearl St., Albany 7
North Carolina	June 25, 1951	Raleigh	F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 9-12, 1951	Fargo	A. B. Crabtree	Ellendale
Ohio			E. D. Lowry	79 E. State St., Columbus
Oklahoma			N. D. Griffith	509 Medical Arts Bldg., Oklahoma City 2
Oregon			A. F. Davis Exec. Secy.	306 Public Service Bldg., Portland
Pennsylvania	Dec. 4-8†	Philadelphia	R. E. V. Miller	Northampton National Bank Bldg., Easton
Rhode Island	Dec. 4-7‡		F. M. Hackett	State Office Bldg., Providence
South Carolina	July 4-7, 1951	Columbia	E. G. Bumgardner	1517 Hampton St., Columbia
South Dakota			R. W. Ellis	Salem

State	Date	Place	Secretary	Address
Tennessee	Dec. 11-15	Memphis	F. S. Maxey	804 Bennie Dillon Bldg., Nashville 3
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin
Utah			J. J. Dalpiaz	Helper
Vermont			F. A. Reid	Windsor
Virginia	June 12, 1951	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond 19
Washington	Dec. 18-22	Seattle	J. B. Kiefer, Jr.	510 Cobb Bldg., Seattle
West Virginia	June 25-27, 1951	West Liberty	C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. J. Ryan	208 Boyd Bldg., Cheyenne

*Dentistry and dental hygiene.
†Dentistry.
‡Dental hygiene.
§Practical examinations.
**Written examinations.
††Clinical examinations.

OTHER MEETINGS

Name	Date	City	Secy. or Chm.	Address
Academy of Denture Prosthetics, Annual Meeting	April 30-May 6, 1951	Washington, D. C.	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine	Dec. 3	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Board of Pedodontics	Feb. 8-10, 1951	St. Louis	R. L. Ireland Secy.	305 Andrews Hall, Lincoln 8, Neb.
American Dental Assistants Association	Oct. 30-Nov. 2*	Atlantic City, N. J.	M. L. Martin Exec. Secy.	410 First National Bank Bldg., LaPorte, Ind.
Chicago Dental Society, Midwinter Meeting	Feb. 5-8, 1951	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago 2
Denver Dental Association, Midwinter Meeting	Jan. 7-10, 1951	Denver	R. R. Maier Secy.	1123 Republic Bldg., Denver 2
Greater New York Dental Meeting	Dec. 4-8	New York	A. E. Corby Chm. Press Publication	Room 106A, Hotel Statler, New York 1
International Academy of Anesthesiology	Jan. 17, 1951	New York	I. G. Tomack Secy.	355 E. 149th St., New York 55
Mid-Continental Dental Congress, Tenth Annual Meeting	Nov. 26-29	St. Louis	J. E. Brophy Exec. Secy.	927 Syndicate Trust Bldg., St. Louis 1
New Orleans Dental Conference	Nov. 5-8	New Orleans	M. R. Matta Secy.	8117 Oak St., New Orleans
Northeastern Society of Orthodontists, Annual Meeting	Nov. 6, 7	Washington, D. C.	O. Jacobson Secy.	35 W. 81st St., New York
Odontological Society of Western Pennsylvania	Nov. 14-16	Pittsburgh	W. E. Craig Secy.	206 Jenkins Bldg., Pittsburgh 22
Pan American Odontological Association, Fourteenth Annual Dinner-Meeting	Dec. 6	New York	R. H. Brodsky Exec. Secy.	14 East 81st St., New York
Rocky Mountain Society of Orthodontists, Annual Fall Meeting	Nov. 6, 7	Denver	E. T. Klein Chm. Program Committee	632 Republic Bldg., Denver 2
Southeastern Society of Oral Surgeons, Second Annual Meeting	Mar. 2, 3, 1951	New Orleans	G. W. Matthews Editor	1922 Tenth Ave., S., Birmingham, Ala.
Southern Academy of Oral Surgery, First Annual Convention	April, 1951	Savannah, Ga.	R. H. Roux, Jr. Secy.	112 W. Jones St., Savannah, Ga.

*Examination for Certification.

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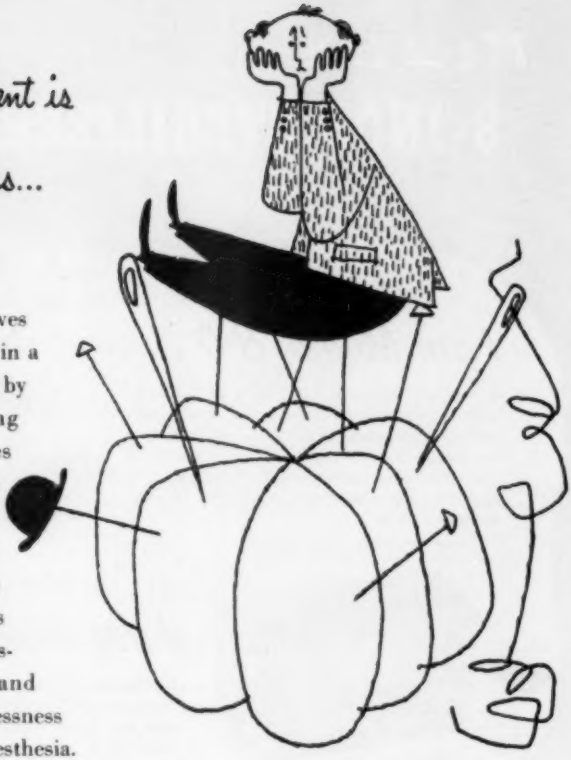

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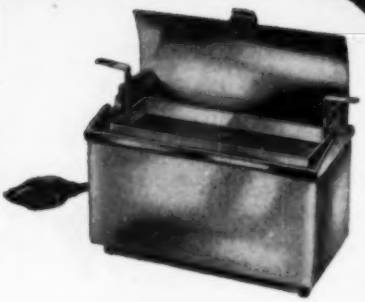

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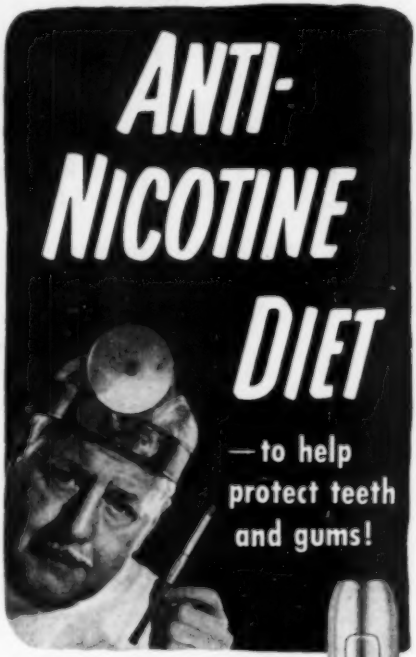

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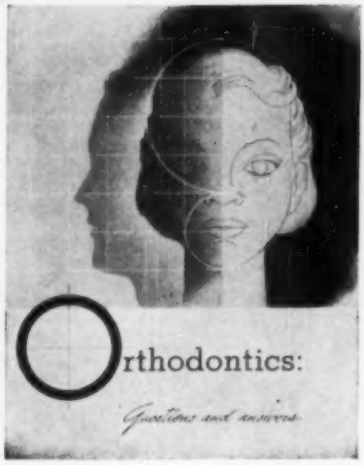

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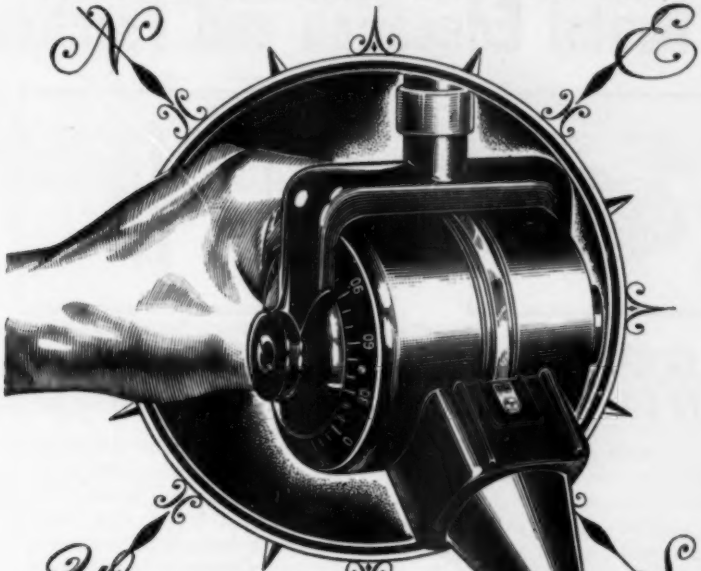

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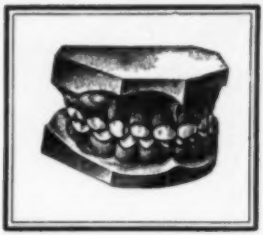

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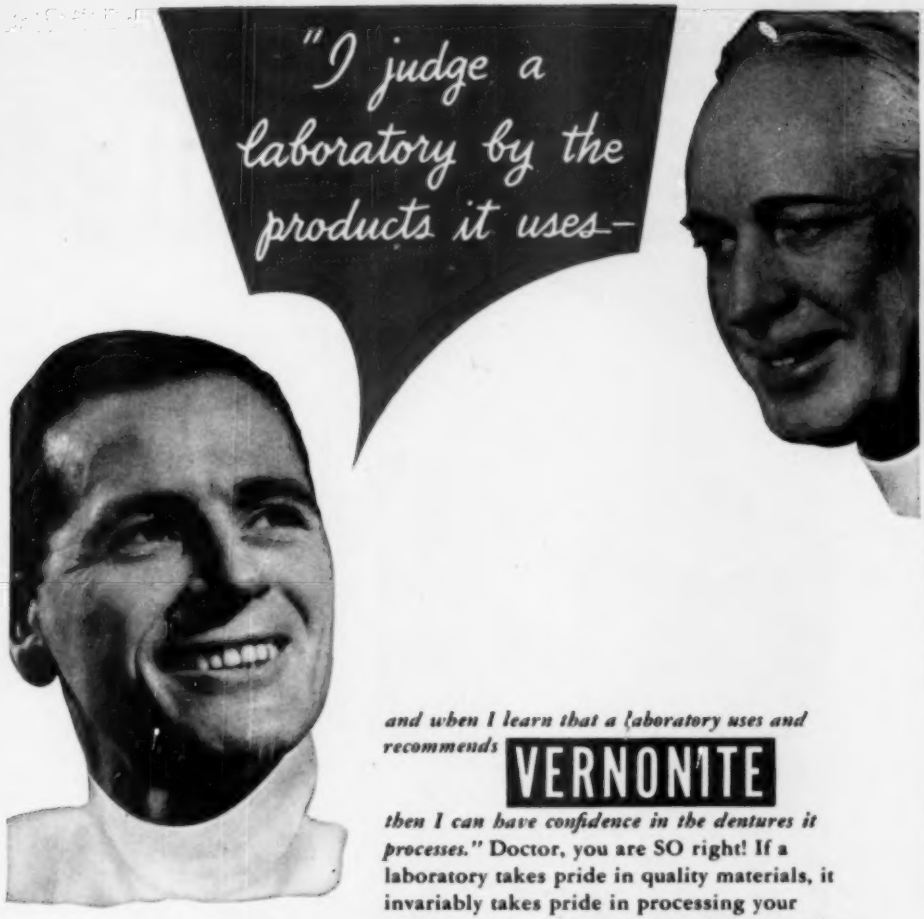

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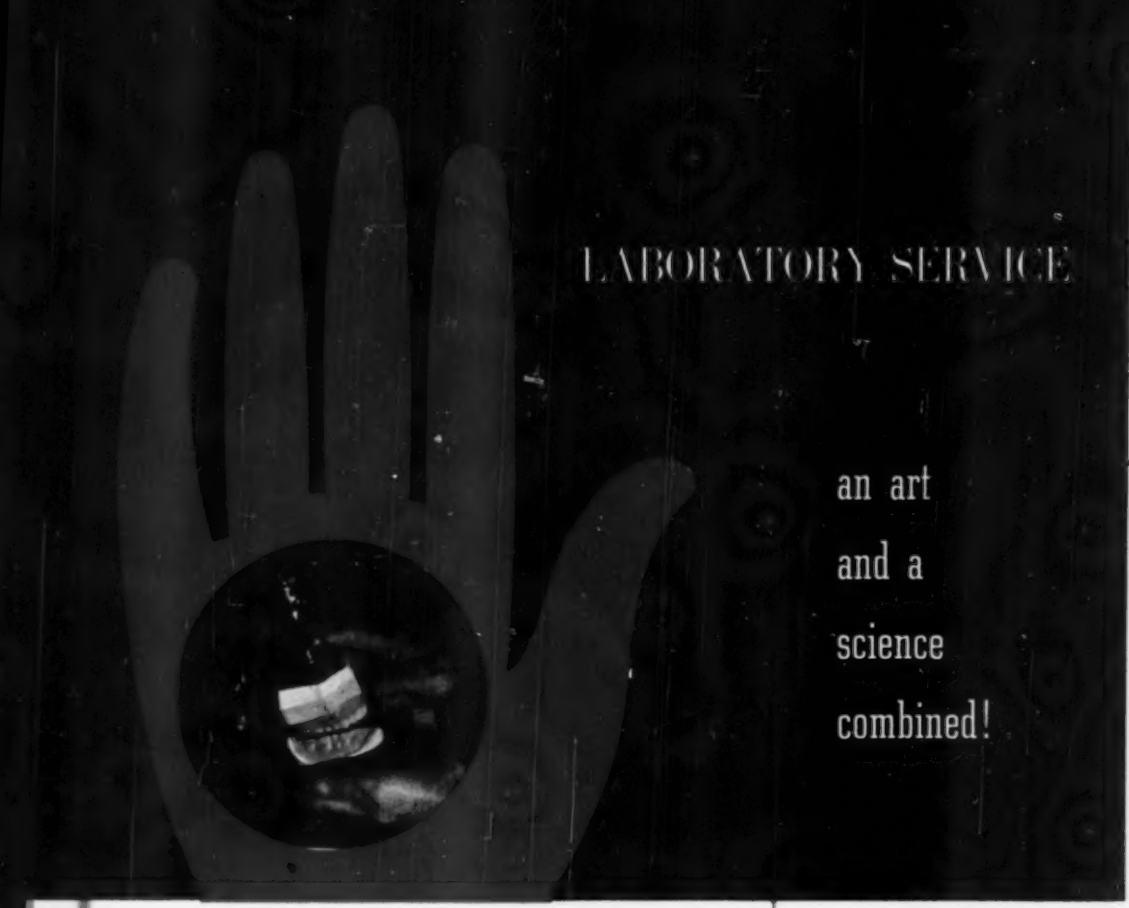

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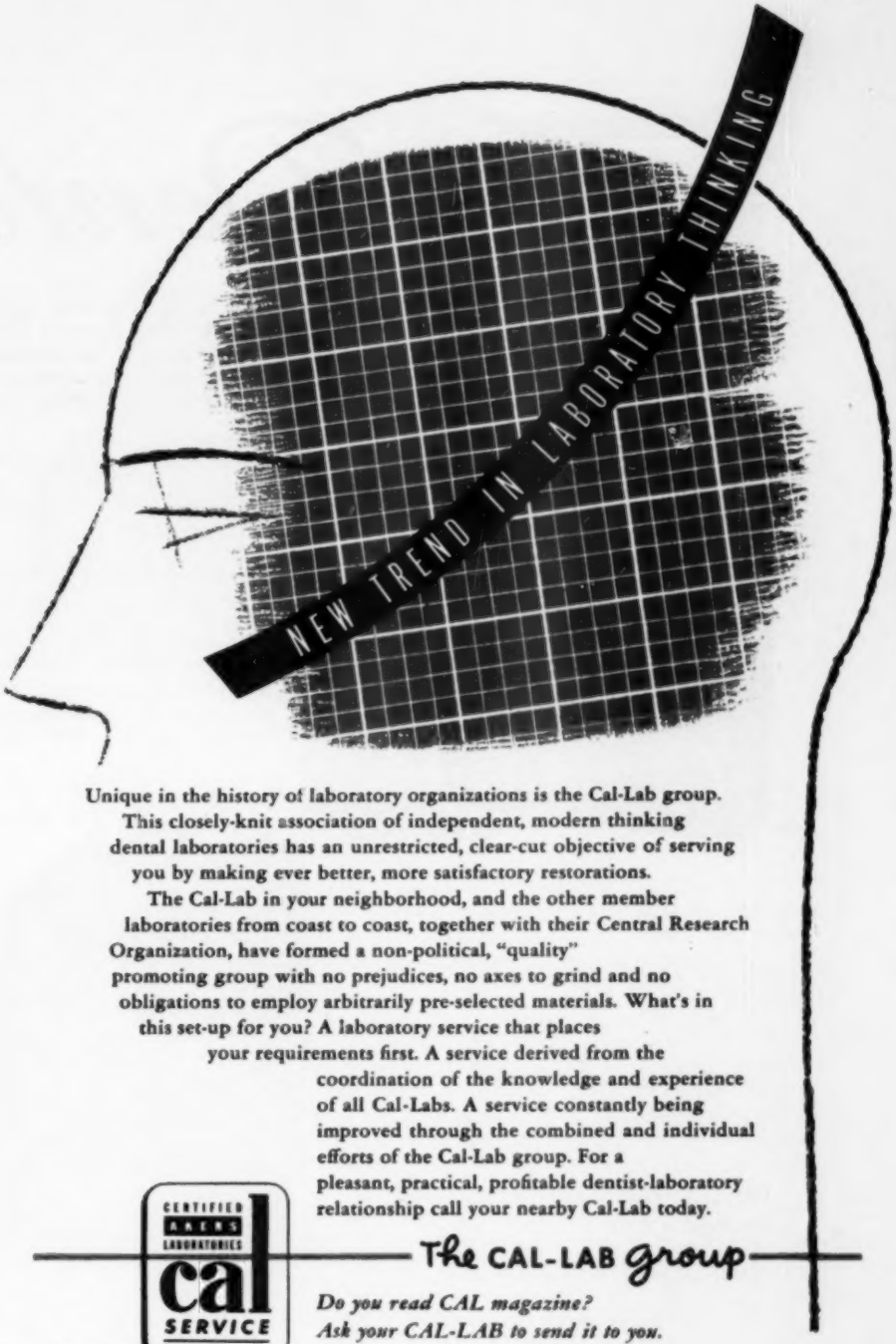

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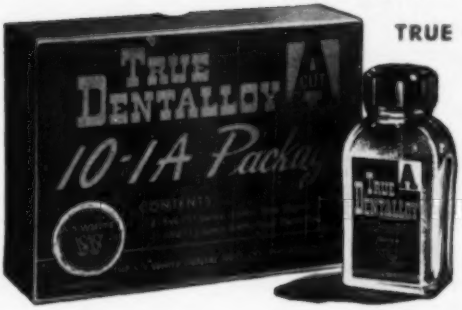

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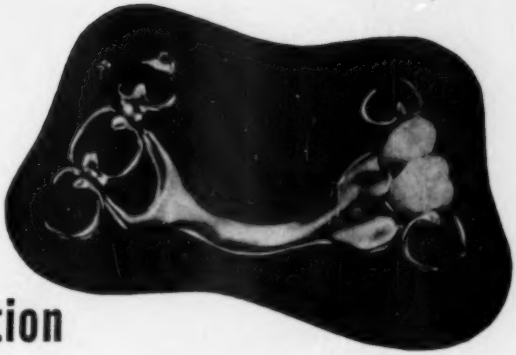

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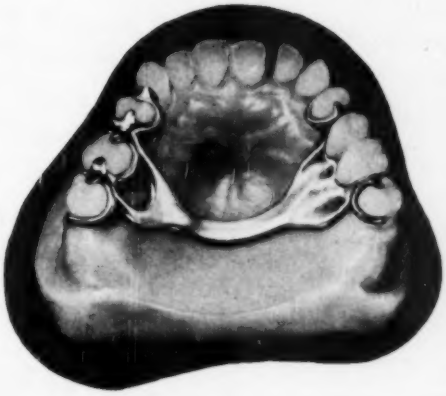

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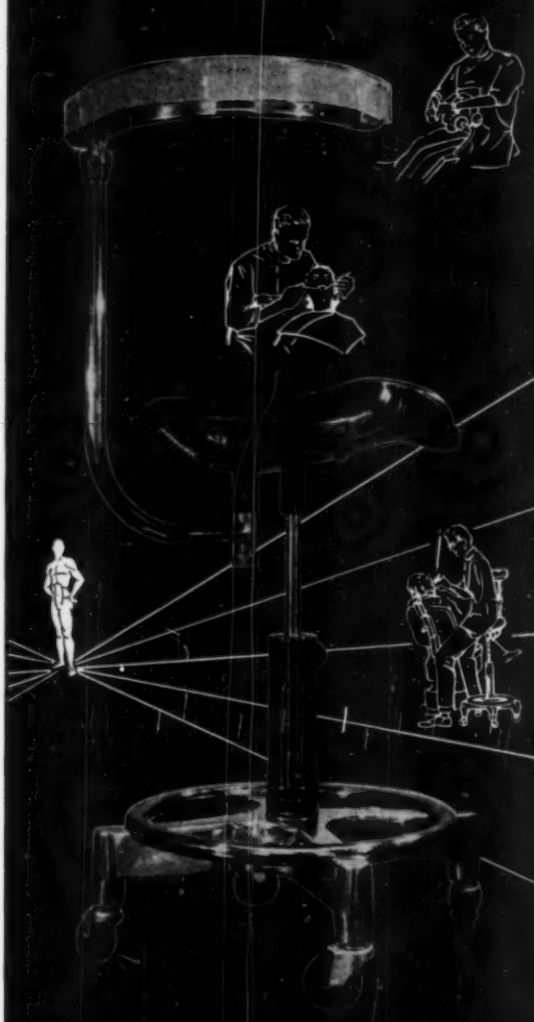

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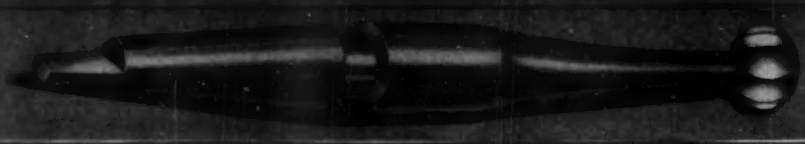

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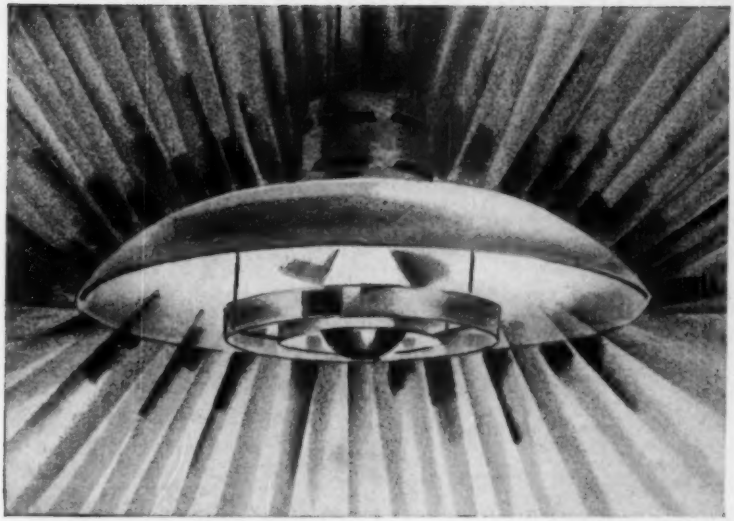

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You spend less energy

You save energy seeing because this revolutionary new light bathes your whole office in soft, glareless radiance—which eliminates the annoying and energy-sapping contrasts.

Unusual Advantages

BRIGHT CEILING—the unique Plexiglass reflector sends 15% of the light upward, 85% down.

TRUE COLORS—there is no paint pigment in the Plexiglass to add or distort colors.

NO MAINTENANCE—there is no paint to scratch and chip. The sleek natural surfaces wipe clean easily.

LONG-LASTING—the plastic reflector and the anodized aluminum suspension rod and louvers are non-corroding lifetime materials.

FLEXIBLE—the GV is adaptable to either high or low ceilings with an inexpensive adaptor. It can be changed from one to the other.

SIMPLE INSTALLATION—your local electrician can install the GV easily.

See your Castle dealer or write: Wilmot Castle Co., 1104 University Ave., Rochester 7, N. Y.

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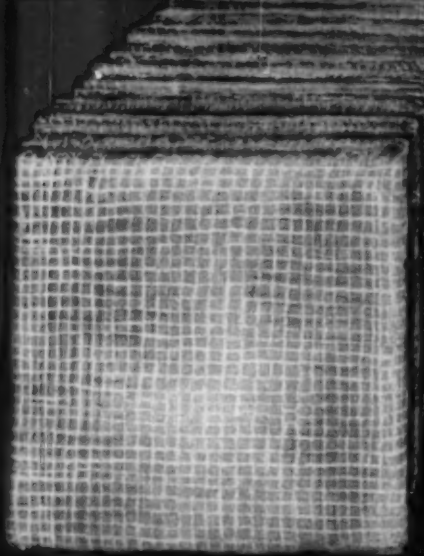
You'd think they'd be more expensive

You gain in economy and efficiency when you use

Johnson & Johnson

EXODONTIA SPONGES



They're more absorbent than any other type of gauze, because of filmated cotton which is evenly distributed throughout the entire inner surface by a special J & J process.

Machine made to assure uniformity. No rough margins or loose threads. When you use them as bite or socket sponges, swabs and dams.

You actually require fewer sponges

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in the LEAK-PROOF CARTRIDGE*

1 **LEAK-PROOF** — the special constrictions at the end of the tube form a positive pressure lock, sealing the tube against possibility of leakage.

2 **READILY FLAMED** — dipping into alcohol and flaming of rubber cap just prior to insertion into syringe serves to provide an unbroken chain of sterility.

3 **PROTECTED AGAINST CONTAMINATION** — because the cap fits into the cartridge and seals not only the top of the glass, but also down the sides of the rubber.

Oradent
ANESTHETICS

Better Materials for Better Dentistry

are available in the following solutions:

4% Procaine HCl (USP) with Neo-Synephrine HCl, 1:2500 (Brand of Phenylephrine HCl)

2% Procaine HCl (USP) with Neo-Synephrine HCl, 1:2500 (Brand of Phenylephrine HCl)

2% Procaine HCl (USP) with Epinephrine 1:50000

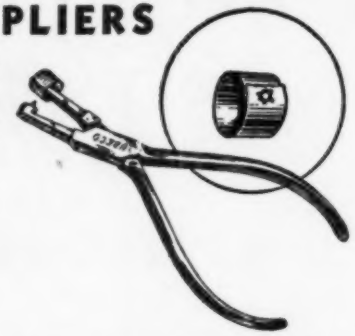
ORADENT DIVISION of **MIZZY, INC., New York 10**

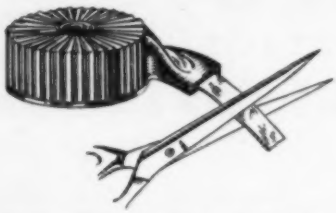
*REG. U. S. PAT. OFF.

A Great Help in Making Any Shape Bands for Plastic or Amalgam Fillings

UBECO RIVETING PLIERS

Make individual matrices for approximal fillings and inlay impressions the quick, easy way by using UBECO Riveting Pliers. Save time—insure a stable matrix—Guarantee an accurate fit. **$7.50**





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Latest safety development in railroading is the remote-control gas heater on switches to make sure that ice and snow don't lock the switch in one position. No longer is this vital accident protection left to a bundled up trainman with a lighted torch. Now... a dispatcher from a control point many miles away starts the heaters by turning a control switch.

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THE SAFETY of each tube of Monocaine Local Anesthetic is assured, not by remote control, but by meticulous care in preparation.

YES . . . WHEN YOU INJECT an anesthetic solution to bring your patients blessed relief from pain, you want to be sure that you are protecting the health — and very life of the patient — by using a *safe* local anesthetic! Monocaine solution 2ME produces anesthesia as deep as procaine 4%, yet its toxicity is appreciably less than that concentration of procaine.

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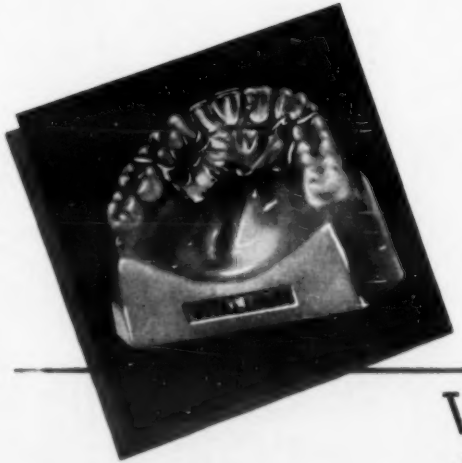

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A-59

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FOR SALE—Modern office and well established practice; Ritter equipment. Excellent location in city within 70 miles of New York City. Address A.D.A. Box 164.

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FOR SALE—Immediately or after association, large practice in largest Southern Ohio city, grossing well over $20,000 per year. Connected living quarters available for rental if desired. Very beautiful office, two operating rooms. Price $5,000, liberal terms. Address A.D.A. Box 193.

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FOR SALE—Well established practice, or will rent on percentage basis. Modern office, completely equipped. Three chairs, x-ray. Hygienist available if desired. Retiring due to health. Excellent opportunity. Address P. O. Box 3266, Orlando, Florida.

●

FOR SALE—Practice in small Connecticut town. Will sell at very reasonable price. Returning to school to specialize. Address A.D.A. Box 204.

●

FOR SALE—Bungalow type office with or without equipment, in suburb of Chattanooga, Tennessee. Seven rooms, plus four utility and supply rooms. Fine practice, established 11 years, good income and reputation. Excellent opportunity. Reasonable. Address A.D.A. Box 173.

●

FOR SALE OR RENT—Practice and equipment in Northwest Iowa town. Trade area population 3,000; no other dentist. Reason for selling: entering service. Address A.D.A. Box 205.

●

FOR SALE—Established practice. Ritter chair and Unit, CDX X-ray, wall type, American cabinet. Castle sterilizer, McKesson gas machine, etc., all new two years ago. Apartment office, ideal location on Kodak bus-line. Reasonable rent. Leaving to specialize. Available December. Address Dr. John B. Woodman, 367 Park Avenue, Rochester 7, N. Y.

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FOR RENT—Fully equipped office in center of Indiana farming community. No dentist in town. Office consists of operating room, laboratory, reception room and business office. Address A.D.A. Box 206.

●

FOR RENT—Three front rooms for dentist. Successful practice previously established for thirty years. Doctor occupies adjoining suite. Community of 4,000. For information write Mrs. Bela Kingman, New Market, New Hampshire.

●

FOR RENT—Dental office, 484 Gramatan Avenue, Mount Vernon, New York. Established location, large apartment building. 4½ rooms. Also available for living quarters but optional, additional 4½ room apartment. Write owner, L. Krass, 60 S. Clinton, Rochester, N. Y.

FOR RENT—Fully equipped operating room in office of well established general practitioner in Southern California. Use of following included: secretary, telephone, laboratory, x-ray, dark-room, etc. Write Box 1537, Glendale, Calif.

●

FOR RENT—Dental office without equipment, South Dakota city of 13,000. Available about January 1st. Previous dental practice established same location forty years. Address Mrs. W. A. Kinsey, 18 E. Kemp Avenue, Watertown, S. D.

OPPORTUNITIES AVAILABLE

WANTED—By philanthropic foundation, dentists under 40 years of age for public health work. Starting salary rate $4,500 per annum. Michigan licensure not required provided the individual is a graduate of an accredited dental school and is licensed in another state. For detailed information write Kenneth R. Gibson, D.D.S., M.S.P.H., Director, Child Health Division, Children's Fund of Michigan, 660 Frederick St., Detroit 2, Mich.

●

WANTED—Hygienist. Excellent opportunity in newly equipped bungalow office one block off the University of Oklahoma Campus. Write Dr. John B. Cole, 706 Asp Avenue, Norman, Oklahoma.

●

WANTED—Associate for orthodontist with busy practice in New York City. State qualifications, age, all particulars. Address A.D.A. Box 207.

●

WANTED—Dentist for operative work in school program in Arizona. Salary $4,000 for ten months, four hours per day. 50-60 years of age. If satisfactory, dentist may direct entire program following year. Write full details to A.D.A. Box 208.

●

WANTED—Associate for Oral Surgeon, northern California. Opportunity for eventual partnership. Supply full details on professional and personal background and photograph. Address A.D.A. Box 209.

OPPORTUNITIES WANTED

DENTIST—Desires to purchase or establish private practice in active Illinois town. B.S. and D.D.S. from Midwestern University. Honorably discharged from Navy Dental Corps after four years of active service. Dr. E. R. Black, 6136 Nelson St., Chicago, 34, Ill.

●

ORTHODONTIST—Wants association with group clinic or individual, or an interesting opportunity for own practice. Willing to take state boards. Not subject to military call. Address A.D.A. Box 210.

●

EXODONTIST—Oral Surgeon, A.B., D.D.S., University of Pennsylvania, now 43, with extensive training and experience, now chief of a large oral surgery service, seeks association with established oral surgeon or group practice in New York or Pennsylvania. Address A.D.A. Box 211.

EQUIPMENT FOR SALE

FOR SALE—X-ray machine, Ritter floor model, cream white, three years old, excellent condition, $900. Also Ritter sterilizer, two years old, cream white, excellent condition, $100. Address A.D.A. Box 212.

●

FOR SALE—Almost new cream Weber unit F7713, Castle light, compressor, Ritter pump chair 1K8193. Also American Cabinet 141. Write where stored: Carl Fisher, 133 N. 22nd St., Philadelphia, Pa.

MISCELLANEOUS

WANTED—Old Dental Books—Orthodontia Journals; Old Dental Prints—Advertisements. Leo L. Bruder, 1 DeKalb Avenue, Brooklyn, N. Y.

Burneice Larson, Director
The Medical Bureau
Palmolive Building
Chicago 1, Illinois

OPPORTUNITIES AVAILABLE

(a) Specialists in prosthetics, oral surgery and pedodontics, certified or eligible, and, also, several general practitioners; dental department recently established in connection with prepaid medical clinic; department operated on fee-for-service rather than prepaid plan; complete dental service provided; approximately 18,000 members.

●

(b) Pedodontist and general practitioner; group appointments; California.

●

(c) Dentist to join staff of dental service having state-wide service; duties those encountered in any well regulated private practice; excellent facilities; full-time, seven-hour day, five-day week; should be interested public health or children's dentistry.

●

(d) Assistant by general practitioner long established; preferably one qualified to take over practice in six or seven years; winter resort town of 165,000; Southwest.

●

(e) Associate; general practice; suburb, winter resort city, Southern California.

●

(f) Pedodontist to become associated with general practitioner; well equipped offices; West Virginia.

●

(g) General practitioner; group appointment; salary, $8000; West.

●

(h) Associate; general practice; well equipped offices staffed by two hygienists, assistant, secretary; salary, percentage leading to partnership; Massachusetts.

●

(i) Dentist to establish private practice in construction town in New Mexico; excellent climate.

●

(j) Oral surgeon to become associated with dentist, well established in Pittsburgh area.

●

(k) Orthodontist to take over well established practice; town of 45,000, California.

●

(l) Assistant; dental department, large state hospital; duties: general practice with prostheses; college town of historic interest; Southeast.

●

(m) Director of department of dental health and, also, dental clinician; former should be qualified direct state wide program; duties of latter consist conducting school clinic; salaries, $600-$800 and $350-$400, respectively.

(n) Resident in oral surgery; well established clinic; staff of 26 specialists; university town; Midwest.

●

(o) Dentist to direct state program of dental health education; graduate training or experience in public health dentistry desirable; $7200, increasing to $8400.

●

(p) Dentist to perform operative dentistry in school program; four hours daily; ten-month year; winter resort city of 100,000; Southwest.

●

(q) Oral surgeon to become associated with surgeon, well established Chicago.

●

(r) Orthodontist; permanent association; busy practice; New York City.

●

(s) Two dentists for general practice and dental intern; new state hospital; Midwest.

●

(t) Dentist to take over practice of dentist joining Navy and to become his partner upon return; Iowa.

●

(u) Orthodontist to become associated with a dentist well established in one of Wisconsin's leading cities.

●

(v) Associate; general practice; town of 100,000, New York; minimum starting salary, $6,000.

●

(w) General practitioner interested children's dentistry; association with two dentists, long established, Chicago area.

●

(x) General practitioner qualified pedodontics, crown and bridge; group appointment; Ohio.

●

(y) Dentists qualified teaching for following departments: Periodontology, Operative Dentistry, Crown and Bridge, General and Oral Pathology, Denture Prosthesis.

●

(z) California-licensed oral surgeon to become associated with surgeon well established in Southern California.

WANTED

(a) Dental hygienist by oral surgeon; college town, Pacific Northwest.

●

(b) Hygienist to assist general practitioner well established in Chicago area.

●

(c) Hygienist to conduct dental education program; state department of health; Southeast.

The Medical Bureau (cont'd)

(d) Hygienist to become associated with several dentists; university town, California.

●

(e) Hygienist to conduct dental education program; newly created position; public schools, resort town located on coast of California.

●

(f) Hygienist and, also, dental x-ray technician; group clinic and hospital appointment; Southwest.

OPPORTUNITIES WANTED

Dentist seeks association, group, public health or industrial appointment; A.B., D.D.S., B.S.D., Midwestern university; eight years' successful private practice.

●

Dentist seeks institutional appointment; B.S., D.D.S. degrees; teaching experience; three years, resident dentist, large hospital.

●

Dentist in forties seeks administrative position in field of dentistry; six years' successful general practice of dentistry; served as chief of dental services for five years during World War II; rank of Lieutenant Colonel at time of discharge.

Pedodontist; D.D.S., Northwestern Dental School; recently completed two years' graduate training in children's dentistry.

●

Oral surgeon; year's residency in oral surgery, large hospital; three years' residency and training, department of oral surgery, state university; has fulfilled all formal requirements for American Board.

●

Dentist with fourteen years' experience in practice limited to orthodontia and pedodontia seeks association; two-year internship, Eastman Dental Dispensary; three years' graduate training in orthodontia.

●

Young dentist, recently received Master's degree in Dentistry (M.S.D.) with periodontia major; previous training includes year's residency in oral surgery.

●

Prosthodontist; recently received Master of Science in prosthetic dentistry; has applied for examinations, American Board of Prosthodontia; four years' general practice before specializing.

●

Public health dentist; D.D.S., M.P.H., Eastern schools; past several years on staff, state department of dentistry.

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MOUTH WASH

Oraline is non-astringent in action—contains no metallic salts. *Concentrated* . . . one bottle makes 2 gallons of soothing, refreshing Mouth Wash. Ask your salesman.

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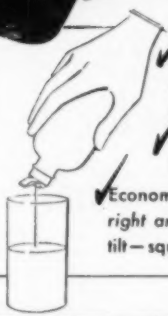

✓Non-breakable; occupies *less* space.

✓Convenient one-hand operation.

✓Economical; for *just the right amount*, lift cap—tilt—squeeze!

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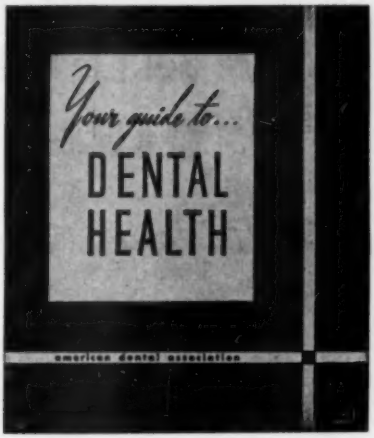
Discusses 27 subjects concerning which questions are frequently asked:



Why we have teeth	Abscess
Structure and shapes	Dead tooth
Primary teeth	Gingivitis
Permanent teeth	Vincent's infecton
Dental hygiene	Pyorrhea
Toothbrushing	Halitosis
Dentifrices	Cold sore
Mouthwashes	Canker sore
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Diet and nutrition	How to select a dentist
Dental caries	Responsibilities of the dentist
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- Indicates dental school attended and date of graduation.

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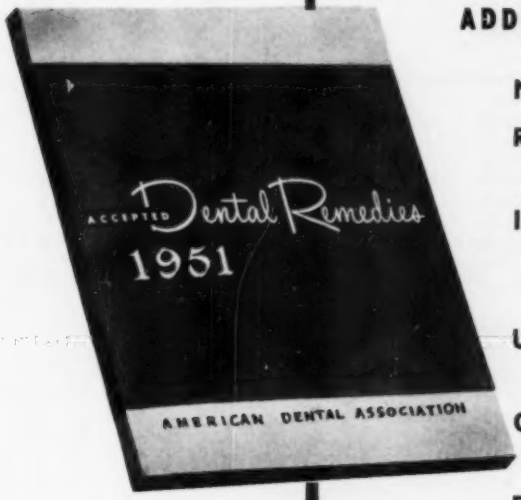

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A job to be done

Illness, accidents, and other unforeseen events each year bring hardship to an increasing number of fellow dentists —compelling them to call upon the A.D.A. Relief Fund for aid.

In order to bring even the barest essentials into the homes of needy dentists in 1951, the fund requires the support of every member of the profession. THE GOAL THIS YEAR IS $100,000. The need is great . . . your immediate contribution is vital.

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One-half of your contribution to the A.D.A. Relief Fund is automatically allotted to your state society. In addition, the A.D.A. Relief Fund pays two-thirds of each grant. Your state and district societies pay the other one-third.

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SEND YOUR CONTRIBUTION TODAY TO THE AMERICAN DENTAL ASSOCIATION RELIEF FUND, 222 E. SUPERIOR STREET, CHICAGO 11, ILLINOIS

Attractive dentures build appreciative patients

A TRUBYTE NEW HUE DUPLICATE of this patient's natural teeth: Centrals — 1R, Laterals — 324, Cuspids — 1Y, Lowers — Mould 44. Shade 62 was an accurate match.

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